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ABSTRACT

A study of a representative sample of 121 World Bank-funded vocational education and training components suggests that the level of economic development and consequent size and dynamism of industrial employment powerfully influence the outcome of such education and training. Consequently, future investment strategies should differ among countries that are at different levels of industrialization. Investments in middle-income countries should emphasize rehabilitation, quality improvement, and further development of institutional efficiency. In lower middle-income and larger lower-income countries, investments should support institutional development and policy issues, including separation of vocational education from other education and development of alternatives to direct government financing. In small low-income countries, resources should be concentrated in nonformal training centers, training quality, development of management capacity in training institutions, and aggressive marketing of training opportunities and services. These and other recommendations were based on the findings from analysis of questionnaire responses that provided quantitative data and narrative descriptive and evaluative data. (A 58-item bibliography and 30 tables appear in the report.) (CML)

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World Bank Discussion Papers

Vocational Education and Training

A Review of World Bank Investment

John Middleton
Terry Demsky

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World Bank Discussion Papers

Vocational Education and Training

A Review of World Bank Investment

John Middleton
Terry Demsky

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Abstract

World Bank investment in vocational education and training (VET) has averaged $500 million a year in the 1980s. Since 1980 there has been a significant shift away from investments in secondary diversified vocational schools to nonformal training centers and university programs. Investments in industrial training have increased while those in agricultural education have been reduced. This change reflects lessons about the effectiveness of different types of training.

In the past ten years, the most striking achievement of VET has been the development of national training systems from nonformal training centers and postsecondary technical education institutions. This has happened largely in middle-income countries, where project investments have emphasized expansion of institutions and the link between training and employment. In middle-income countries all types of training - secondary, nonformal, post-secondary, and VET teacher training - have been successfully established.

Investments in low-income countries, especially those in Sub-Saharan Africa, have been less successful. Implementation weaknesses and stagnating economies have made it difficult to set up any type of training. Efforts are hampered by inefficiency and poor participation. Investment in national training programs has just begun in these poorer countries, and success is uncertain because of continuing economic constraints.

These patterns suggest that the level of economic development and the consequent size and dynamism of industrial employment have a powerful influence on the outcome of investments in vocational education and training. Therefore, future investment strategies should differ substantially among countries at different levels of industrialization.

In middle-income countries where national training systems already exist, VET investments should emphasize rehabilitation, quality improvement, and further development of institutional efficiency.

Some of the lower-middle-income (and larger low-income) countries are in the early stages of developing national training systems and can benefit from the experiences of the more advanced countries. VET investments in those countries should support institutional development and policy issues, including separation of vocational training from other education and development of alternatives to direct government financing.

In small low-income countries, recent Bank experience suggests that resources be concentrated in nonformal training centers, training quality, development of management capacity in training institutions, and aggressive marketing of training opportunities and services.

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EXECUTIVE SUMMARY

i. The nature of World Bank-assisted investment in vocational education and training (VET) for industrial employment has evolved substantially over the past twenty-three years. The share of education sector lending for VET has declined as investment in primary education has increased. Absolute VET investment reached a peak of $845 million in FY80, and has fluctuated annually since then around an average of $500 million. Within VET, there has been a significant shift away from investments in secondary diversified and vocational schools towards nonformal training centers and university-level programs. Investments in VET for industry have increased, while those for agricultural education and training have decreased substantially. These shifts reflect lessons learned through experience about the relative effectiveness of different modes of training.

ii. Most striking has been the development in the last decade of national training systems built around nonformal training centers and post-secondary technical education institutions, primarily in middle income countries. These have been developed through sequences of project investments that emphasized the development of institutional capacity and linkages between training and employment. The systems, and the project components that supported them, have performed well on implementation criteria, and the evidence suggests a reasonable level of training effectiveness as well. It has been possible to establish all modes of training -- secondary, nonformal, post-secondary, and VET teacher training -- in middle income countries.

iii. In contrast, investments and institutions in low income countries, especially those in Sub-Saharan Africa, have been comparatively less successful. Implementation weaknesses and stagnating economies have made it difficult to establish any mode of training, and the evidence suggests low utilization and efficiency. Investment in the development of national systems has only just begun in these countries, with uncertain outcomes due to continuing economic and implementation constraints.

iv. Overall, these patterns suggest that the level of economic development, and the consequent size and dynamism of industrial employment, exert powerful influence on the success of investments in vocational education and training. Future investment strategies should thus differ substantially across countries at different levels of industrialization.

v. In middle income countries, investments in existing national systems are likely to emphasize rehabilitation, quality improvement, and continued institutional development towards improved efficiency. In some cases building the capacity of national systems to assume new roles in technology adaptation and productivity improvement will be important.

vi. A number of lower-middle income (and some larger low-income) countries are at an earlier stage of systems development. The experiences of more advanced countries will be useful to continuing investments; these will include support for policy and institutional development. Key policy issues will be clear structural separation of training from general education and the development of alternatives to direct government financing.

vii. In small low income countries, recent Bank investment experience suggests strategies that concentrate resources, and that emphasize nonformal training centers, training quality, development of management capacity both in training institutions and in enterprises, and aggressive marketing of training opportunities and services. Regional professional support institutions merit consideration.

viii. For investments supported by the World Bank, at least, the vocational secondary school has become a less attractive mode of training. Vocational secondary schools can be effective in middle income countries when they acquire the characteristics of effective nonformal centers -- strong linkages with enterprises, and the ability to respond flexibly to changing labor markets and to offer salaries and incentives sufficient to attract and retain qualified instructors. In low income countries, weak implementation capacity and the nascent stage of enterprise development, coupled with the curriculum and staffing rigidities and recurrent cost constraints characteristic of Ministry of Education operations, have made it difficult to adapt the secondary model effectively in these directions.

ix. At the same time, strong secondary education is important to trainability, either after employment in enterprises or before in nonformal centers. In this context, the decline of Bank investment in general secondary education over the past decade needs re-examination. A new concept of secondary education in the low income countries is needed.

x. Thus the Bank faces both an opportunity and a challenge in providing support for vocational education and training over the balance of the century. The opportunity is to capitalize on -- and to extend -- the generally successful pattern of training systems development in middle income countries. The challenge is posed by the problems of developing cost-effective training systems in small low- income countries, notably in Sub-Saharan Africa. Successful investment will require a very high level of policy and institutional development content; of special importance will be continued development of alternative financing arrangements.

xi. These conclusions emerge from an analysis of World Bank investments in vocationally-specific education and training for industrial employment in the period FY63-86. The review is based on a sample of 121 of the 213 industry VET components in the 320 education sector projects financed during the period. The sample was drawn to be representative across training modes, regions, and country income levels. It emphasizes more recent investments and countries where a sequence of project

investments has been made. The sample represents 60% of the total project costs of all 320 projects.

xii. The analysis addresses four questions. What are the characteristics of investments in VET in terms of size and type of investment, costs and overall implementation performance? What were the elements of investment design? What strategies have been employed in developing national training systems? What was the record of performance of components and institutions; what factors contributed to or inhibited success? The main findings under each question are summarized below.

MAIN FINDINGS

Characteristics of the Investments

xiii. The size of the projects financed, and of of the VET components within them, varied directly with the income level of the country. The smallest projects and components were in Africa, the latter averaging about US $7 million; the largest projects were in Asia. VET components in Asia, LAC and EMENA were similar in size, averaging about four times the cost of components in Africa.

xiv. Project performance, as measured by time overruns and institutional performance, varied relatively little, and then more by region than by country income level. By region, the best performance was achieved in Asia and EMENA, followed by LAC. Overall, there was a slight project cost underrun. On completion delays these investments performed as well as primary education projects financed during the period (average 31 months); on institutional performance they compare favorably to all education sector projects completed in FY84 and FY85.

xv. The institutions supported were smallest in terms of places in EMENA and in low income countries. Total investment costs per place created were significantly higher in Africa and in low income countries. These costs vary considerably across modes, income levels and regions; the data indicate, however, that the investment costs associated with producing a skilled worker are roughly equivalent for secondary and nonformal institutions. Teacher training places have been most costly overall. Cost differences can be explained by economies of scale only for secondary institutions across income levels.

xvi. These investments have provided increasing support over time for furniture and equipment, and for technical assistance, consistent with recent project emphasis on rehabilitation and institutional development.

Investment Design

xvii. The economic justifications of the sample components rarely addressed short and medium-term labor market demand factors, relying instead on general manpower requirements forecasts based on assumptions regarding economic growth. Where such growth did not materialize (as was

the case in most low income countries), these forecasts have been generally inaccurate. Most were done by Bank staff or UNESCO consultants. It is reasonable to assume, given a parallel lack of attention to shorter-term planning, that manpower forecasting diverted attention from the establishment of more flexible and responsive planning mechanisms. Labor market factors have received more attention in later investments in middle income countries, most of which have supported the development of national systems based on nonformal training centers.

xviii. Relatively little has been done in these components to address training opportunities for women, although a general thread of concern for better access of disadvantaged groups runs through most of the investments. Improving the income of disadvantaged groups requires more than training. Attention to employment codes and practices, and management attitudes and capacity, is also needed. There is no evidence that these issues were addressed in the components sampled.

xix. Sector analysis has been important, generally leading to significant investments in institutional development. Sector work in Africa is beginning to contribute to policy and institutional development, although the frequency and policy relevance of sector analysis have lagged behind that in other regions.

Development of National Training Systems

xx. A clear pattern of success emerges from the analysis of investment strategies. Increasing emphasis in middle income countries has been given to the creation of national training systems. These are largely based on nonformal modes, are well linked with employers, generally seek to develop alternative financing schemes, and incorporate professional support institutions that establish the permanent capacity for curriculum development and teacher training. Testing and certification systems provide feedback to system managers and to employers on performance. Curriculum development is often based on occupational analysis, providing another practical link between training and employment. These systems also incorporate post-secondary technical education institutions.

xxi. Management of the nonformal system is most often based in autonomous or quasi-autonomous training agencies, or in units of the Ministry of Labor. There is a clear administrative separation of vocational training and technician education at the post-secondary level, with the latter managed by Ministries of Education. Many of the national training systems employ a significant degree of decentralization in order to strengthen training center responsiveness to local industry needs. Decentralization strategies, however, have encountered implementation difficulties where adequate preparation of decentralized units has not been undertaken.

xxii. Such systems may be under development in current projects in a limited number of countries in Sub-Saharan Africa. However, most of the early investments in these countries have been small projects supporting a few vocational schools; in later years these have supported nonformal

training centers. Sustained investment in systems development in Africa has so far been comparatively rare.

Performance

xxiii. Data on the economic outcomes of training are absent from project evaluations. Reliable unit recurrent cost data is almost entirely lacking, although the data that are available confirm that secondary vocational schools are more expensive than general secondary schools. Thus assessment of investment performance is largely limited to criteria of implementation success.

xxiv. The exception is found for the investments in Asia. There information on graduation rates, placement rates and employer satisfaction was available for a sufficient proportion of the components to justify inferences. On all three criteria, the institutions supported in these components performed very well. These included all modes of training.

xxv. On the criterion of proportion of enrollment targets achieved at completion, performance varied directly with the income level of the country. About 40% of targets were achieved in low income countries; 90% in lower-middle income countries, and 109% in upper-middle income countries. Overall, there was little variation across modes. However, secondary vocational schools performed best overall, and slightly better across income levels than the more complex nonformal institutions. The data indicate that it is difficult to establish any institutional mode in low income countries (including secondary vocational schools), with weak implementation capacity and financial constraints. The opposite is true for middle income countries.

xxvi. This criterion, of course, does not capture the eventual enrollment performance of project institutions, many which suffered from significant delays in completion. But it can be taken as an indicator of the difficulties encountered in establishing a given mode of training.

xxvii. These findings are mirrored in ratings of institutional performance of VET components. On a regional basis, components in Africa performed at a significantly lower level than those in the other three regions.

xxviii. Secondary vocational schools have performed well on implementation criteria in part due to the relative simplicity and familiarity of their institutional design. In low income countries, and in Africa, while these have performed better than more complex and less familiar nonformal institutions, the absolute level of performance has been very low. Many appear underutilized. They have had much less success in establishing linkages with employment than nonformal and post-secondary institutions. Ministry of Education teacher salary scales have made it difficult to pay wages adequate to attract qualified staff, contributing in many African countries to continuing reliance on expatriate teachers.

xxix. Preference for nonformal training centers under these circumstances rests on successful experience in middle income countries, and on the greater inherent potential for flexibility and efficiency that nonformal training provides. Whether indeed this potential can be realized in low income settings remains an open question.

xxx. Successful investment programs in middle income countries had in common nine characteristics:

a. Long Time Perspective With Multiple Investments

b. Expanding Industrial Employment

c. Small Beginnings in Formal Institutions, and Incremental Expansion

d. Planning That Responded to Labor Market Demand

e. Early and Sustained Involvement of Enterprises

f. Evolution of Policy and Management Capacity to Match System Complexity

g. Increasing Attention to Alternatives to Direct Government Financing

h. Investments in Training Quality: Permanent Curriculum and Staff Training Capacity, Testing, Attractive Salaries for Staff; Incentives to Attract Good Students

i. Flexibility of Curriculum and Institutional Design

xxxi. Less successful investments were weak on most, if not all of these characteristics.

xxxii. There are indications that some of these lessons are being applied in current investments in low income countries in Sub-Saharan Africa. Institutional capacity is being strengthened in five countries; in seven others support is being given to developing nonformal training centers. Since FY80 only one investment in Sub-Saharan Africa has supported a vocational secondary school.

I. Introduction

1.01 Investment in vocational education and training (VET) has been the cornerstone of World Bank education sector lending since the first education loan in FY63. The investments have supported a range of institutional arrangements for the delivery of training at skilled worker, technician and professional/managerial levels, including secondary vocational schools, center-based nonformal training and apprenticeship, polytechnics and occupationally-specific university departments and programs, and teacher training for both VET and general education. Also included have been "diversified" secondary schools that add some vocational content to general education. The investments have provided training in support of employment in industry, agriculture and commerce/services.

1.02 More than half of the total cost of projects supported by World Bank education sector lending in the period FY63-86 was devoted to VET. In the period FY63-76, investments in all forms of VET represented 62% of total project costs. Annual lending volume for VET grew from $6.6 million in FY63 to $160 million in FY 76, with an average annual value of $150 million. As lending for primary education expanded from the late 1970s onward, the share of World Bank education sector lending devoted to VET declined proportionally to 51% . However, absolute VET lending volume increased, reaching a peak of $845 million in 1980, and fluctuating thereafter around an average of $500 million per year.1/

1.03 The shape of this investment program has changed substantially over the past twenty-five years. Lending increased for industry VET, and decreased for agriculture. Within industry VET, investments in center-based nonformal training administered outside ministries of education and in university-level programs has increased relative to other modes. Investment in diversified secondary schools has declined sharply.

1.04 In recent years increasingly constrained education budgets, the comparatively high costs of VET and concerns regarding the external efficiency of some VET institutions have raised questions as to the cost-effectiveness of alternative investments in training. A number of international agencies, including the World Bank, CIDA and the GTZ (Germany) are carrying out broadly-based policy analyses and reviews. This study of World Bank experience with investments in training for industrial employment has been undertaken as part of the Bank's broader policy analysis.

1/ A comprehensive analysis of patterns of World Bank investments in VET may be found in Antoine Schwartz. Profile of World Bank Financed Investments in Vocational Education and Training. Population and Human Resources Department, World Bank (1989, forthcoming).

SCOPE AND LIMITATIONS OF THE REVIEW

1.05 The purpose of this review is to identify lessons from Bank experience with investments in vocational education and training (VET). The study is limited to training for modern sector industrial employment, and further to four training modes: secondary, post-secondary, nonformal and vocational teacher training. Not included are university-level VET investments, diversified secondary schools and general teacher training.[2/]

1.06 Like all operational reviews, the study is concerned both with investment projects and the institutions that these support. There are five principal questions, each treated in a separate section of the review:

(a) What are the characteristics of these investments in terms of size and type of investment, costs and overall implementation performance?

(b) What were the elements of investment design? How were these investments justified and planned?

(c) To what extent have effective training systems been developed? What investment strategies were employed?

(d) What was the record of performance of project components and institutions, in implementation and in terms of educational outcomes? What factors contributed to or inhibited success?

(e) What lessons can be drawn for future VET investment?

1.07 The scope of the review and the answers to these questions are necessarily limited to the experience of the Bank and its Borrowers with training for modern industrial sector employment, and with the four modes of training selected. While the Bank has been the single largest investor in education in developing countries,[3/] its experience is not necessarily representative of all VET investment.

2/ Training for employment in agriculture, and in services/commerce, is being analyzed in separate reviews. University-level investments will also be treated separately; teacher training and diversified secondary schools have been analyzed previously (see Haddad, 1985; Haddad and Conly, 1987; Psacharopoulos and Loxley, 1985).

3/ The Bank provided 14-20% of external aid to education annually between 1980 and 1986. See Program for Accelerated Educational Development. Population and Human Resources Department, World Bank. April, 1988.

1.08 The review does not address the substantial investments made by the Bank in project related training (PRT), or in education components in projects in other sectors, with the exception of a limited number of "free standing training projects."[4/]

1.09 However, the review does cover the employment sector -- industry -- receiving greatest emphasis in training investment (80% of total VET investment in FY77-86). The four modes studied accounted for somewhat more than half of this investment (with the balance coming largely in university-level projects).

1.10 Finally, the retrospective nature of the review focuses attention on what has been done in the past, and to a lesser extent on the nature of current investments. There are significant issues in VET -- for example, the contribution of training to informal sector employment -- that fall largely outside of World Bank experience, however important they might be for the future.

DEFINITIONS AND CONCEPTS

1.11 The field of vocational education and training is beset by definitional problems. In his review of the literature on the cost-effectiveness of training, Dougherty notes that "... much of the controversy in the literature appears to be attributable to antagonists unwittingly focussing on two different points in what is in effect a continuous spectrum and then arguing at cross purposes." (1989, forthcoming).

1.12 Clarity is needed along two dimensions. One is essentially static. This is the definition of what is being studied, requiring the utilization of a taxonomy that makes it possible to distinguish among the various purposes and institutional arrangements that characterize the "continuous spectrum" of training provision. The second is dynamic. A conceptual model is needed in order to identify, a priori, the basic elements of training systems that, taken together, determine cost-effectiveness. These elements, in turn, can serve as the common template for the evaluation of varying kinds of training investments.

4/ PRT investments have been recently analyzed in:

Annual Operational Review FY87: Education and Training. Population and Human Resources Department, World Bank, March, 1988.

H.W. Barker. General Operational Review of the Treatment of Manpower and Training Issues in Sector Work. Background Paper PHREE/88/03.

A Taxonomy of Training

1.13 A fundamental premise of this review is that the nature and effectiveness of various training systems depends on the degree to which they fit the needs of economies at different levels of development. Training systems in low income countries will address different training needs, and encounter differing institutional constraints, than those in middle income or developed countries. Thus an important dimension of any taxonomy will be some proxy measure for the level of economic development.

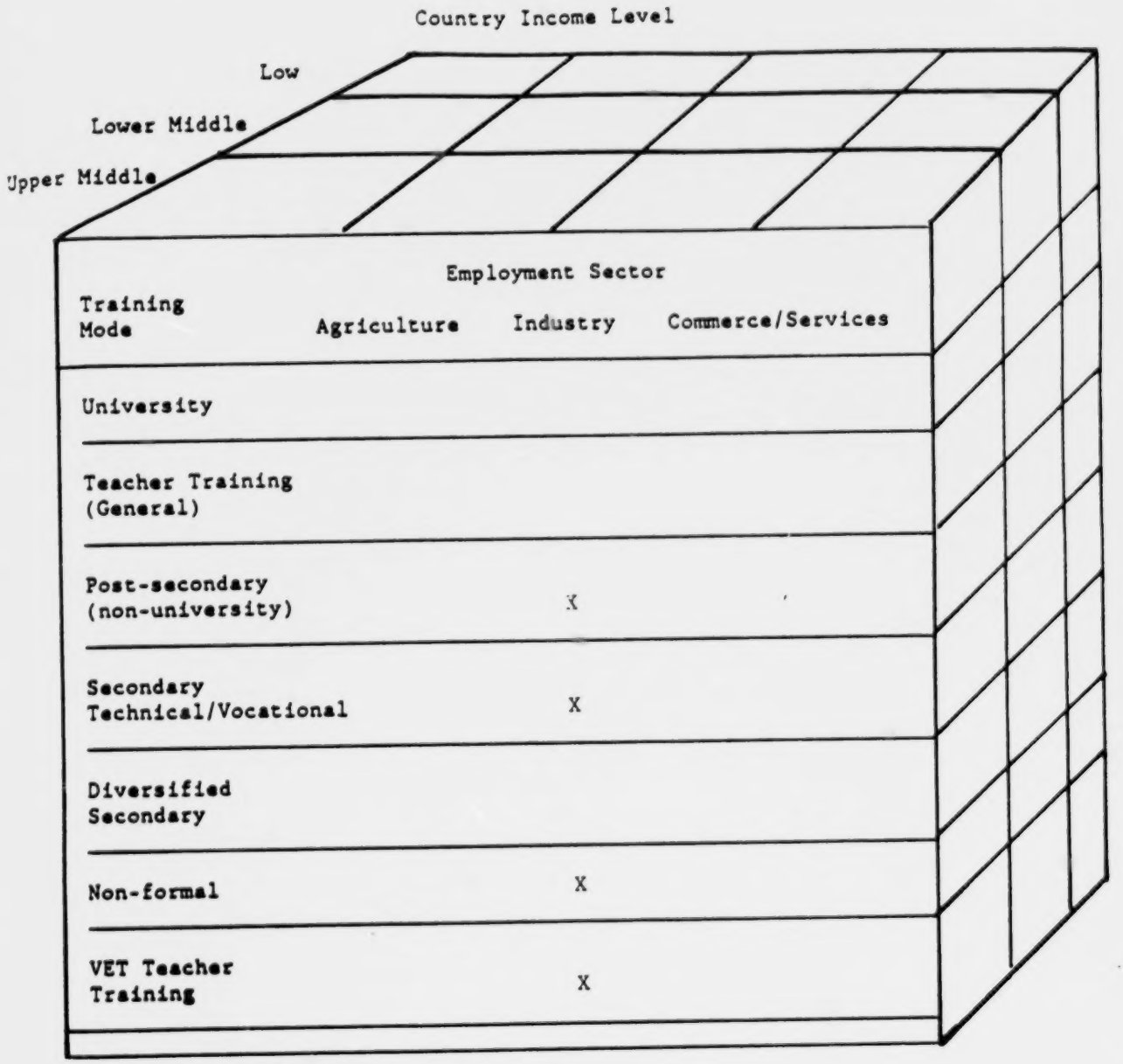
1.14 A second key dimension is the sector of employment. Labor market demand, and skill needs, differ across the sectors. Moreover, training systems are often organized and administered separately, especially those for agriculture.

1.15 The mode of training is an important third dimension. Training is organized in a great many ways, and as noted earlier, there is considerable uncertainty as to how these modes should be categorized. Under any system, a given label -- such as "vocational secondary school" -- will mask considerable variety in the way in which training is organized and delivered. Nevertheless, some categorization is needed, especially one which identifies modes with the skill level for which training is provided. Here again we encounter a continuum rather than clearly distinguishable categories, but it is reasonable to use the three levels most commonly referred to in both the literature and investment documents: craft or skilled worker; technician; and professional.

1.16 A matrix taxonomy of VET using these three dimensions is presented in Figure 1. Country income level, as reported in the World Development Report, is used as a proxy for level of economic development. The three principal sectors of employment form the second dimension.

1.17 Seven institutional modes for vocationally-specific education and training are identified: university, teacher training for general education, diversified secondary, post-secondary, secondary and nonformal. Taken together, these modes define the universe of types of vocational education and training in which the World Bank has invested. The scope of the present review is indicated in the matrix.

Figure 1: Taxonomy of Vocational Education and Training



X= Covered in this review

1.18 These modes differ in two ways. Of primary importance is the fact that they provide training for different levels in the occupational structure. Secondly, they differ in the degree to which they are articulated with the formal education system, offering diplomas and degrees which enable completers to enter higher levels of education.

1.19 University VET encompasses courses of study (such as engineering, medicine, pharmacology, and business administration) that prepare individuals for specific occupations at a professional level. Teacher training for general education also prepares for a specific profession.

1.20 Post-secondary institutions in this taxonomy comprise all types of formal education that require graduation from secondary school for entrance and that prepare students for specific occupations, but which offer less than a university degree. Training at this level is primarily oriented to the preparation of technicians, and requires relatively long (two-three year) courses, often combined with practical work in enterprises. In some cases completion of a post-secondary program enables students to enter higher levels of university education.

1.21 Secondary vocational and technical schools train skilled workers and craftsmen through curricula in which the larger share of student time is devoted to practical subjects and workshop training, with the balance being comprised of general education subjects. In the Bank's experience, these have generally been publicly financed and managed by Ministries of Education, although a small number of specialized secondary schools, such as for agriculture, have been managed by other Ministries. It is generally intended that graduates of these institutions will enter the labor market, though they often can and do enter higher levels of formal education. Although the distinction is not always entirely clear, diversified secondary schools (i.e., those which seek to add practical experience to the curriculum but which are not solely designed to provide terminal job training experiences) are not included in this definition.

1.22 The term "nonformal" is used as a label for a range of training institutions that prepare craftsmen and skilled workers.[5/] The output of such institutions generally enters the labor market on terms similar to those of graduates of secondary vocational/technical schools. "Non-formal" institutions are almost always located outside of the formal education system, and do not provide diplomas and access to higher levels of education. Included are centers and formalized apprenticeship schemes managed most often by Ministries of Labor or public corporations with varying degrees of autonomy, as well as specialized training institutions

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5/ The most unsatisfactory aspect of this label (which is widely used) is that it implies a low level of training organization. In fact, training in such institutions is highly organized, and in that respect similar to that in "formal" training organizations.

established within public agencies to serve particular sectors of the economy -- such as construction, transport, and agriculture.

1.23 This definitional taxonomy has been used to structure the sample of industry VET project components on which the review is based. Four dimensions of the sample are used for comparative analysis of Bank VET investment experience: a) country income level, (b) training mode, (c) region and (d) changes over time.

A Dynamic Conceptual Model

1.24 A dynamic conceptual model of training systems has been developed for heuristic purposes as part of the overall research plan for the Bank's broad VET policy study (Middleton and Schwartz, 1986). A social systems approach was taken in order to identify the key factors that determine both the internal and external efficiency of any training institution. These factors then become the basis for the identification of variables and data needs for a range of studies, including operational reviews and field cases.

1.25 The model (Figure 2) rests on the basic premise that the internal and external efficiency of any training system (8.0) are determined by the interaction of the system with employment systems (5.0). The two are dynamically connected by flows of information and resources, including a crucially important feedback component on the effectiveness of skills development (16.0).

1.26 The model is generic. The nature of its components and connecting flows, however, is likely to be very different in distinctive political and economic systems. The model provides a structure for the analysis of VET systems, suggesting where to look for the key elements and potential points of policy intervention.

1.27 The model shows how the political and economic system of a society, as shaped by external economic and social factors (1.0), functions through its policy institutions and mechanisms (7.0) to establish basic policy and resource parameters (9.0, 10.0) for training (8.0) and employment (5.0) systems. Differences in these basic resources and policy parameters lead to differences among training and employment systems. These are each comprised of dynamically-linked sub- systems that determine efficiency and effectiveness. In the training system, for example, training is comprised of teachers, students, facilities and equipment linked through a curriculum and learning activities. In the employment system, manpower is joined with other resources and technology in the production process.

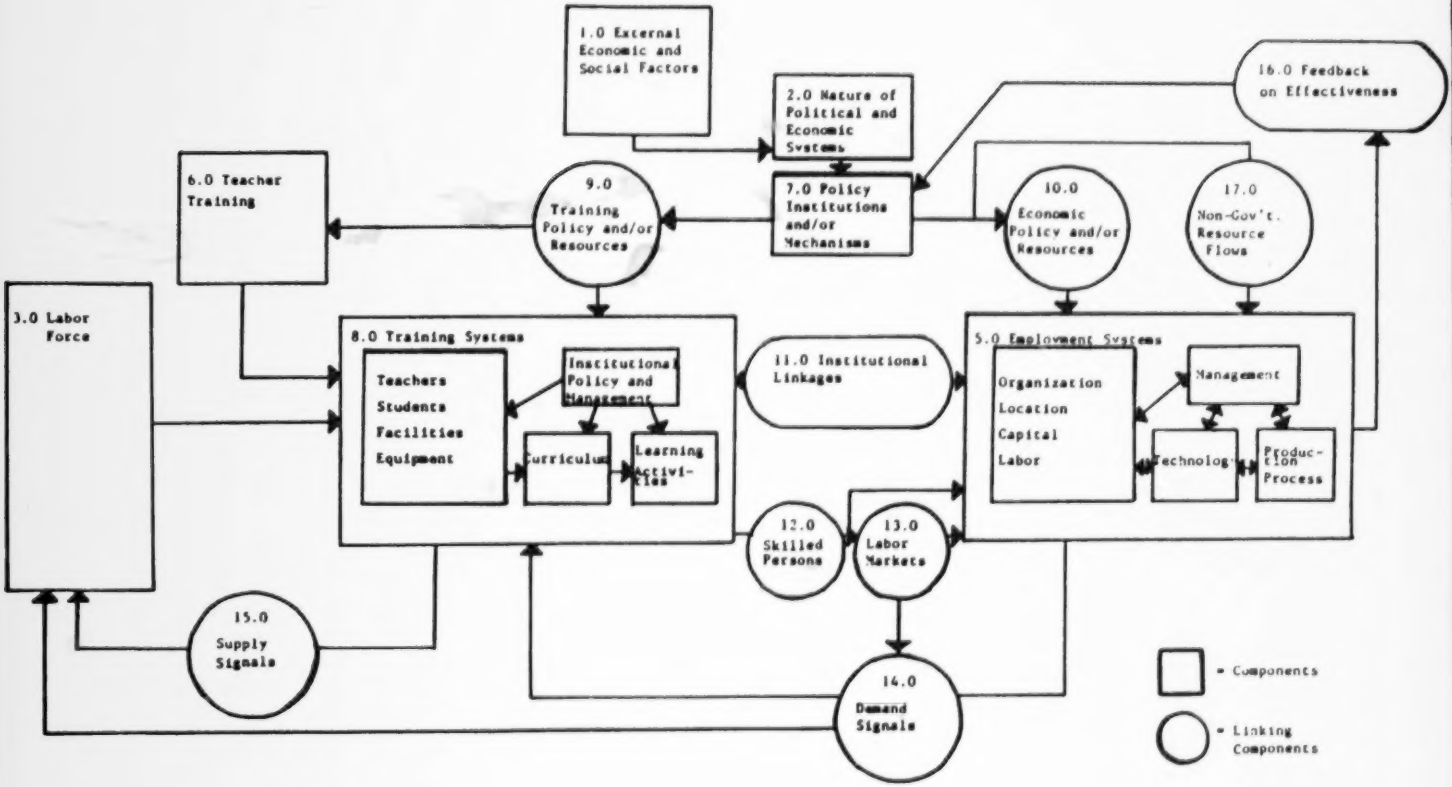

Figure 2: Conceptual Modes of Skill Development and Employment

Source: Middleton and Schwartz (1986)

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1.28 Training and employment systems are linked in several ways. For example, the product of the training system, skilled persons (12.0), is used by the employment system. Labor markets (13.0) or employment mechanisms in the enterprise mediate the flow of persons between training and employment systems. The employment system sends demand signals (14.0) to the labor force (3.0). The labor force also receives supply signals (15.0) related to training places from the training system. The model includes, in addition, institutional linkages (7.0) between the two systems. These may come in various forms ranging from advisory committees of employers on training curricula to formal contracts for training services. The equilibrium of the skills development process is maintained by the feedback mechanisms on employment, which are used to modify policy, and by demand and supply signals (14.0, 15.0).

1.29 The connecting linkages between the three systems play a vital role in the efficiency of skills development. The internal efficiency of VET, for example, is shaped by institutional policy and management within the training system; these determine how a training institution uses inputs of information and resources to produce skilled persons. As a consequence, the effectiveness of institutional policy and management will depend in part on the nature of externally determined training policies and resources (9.0) furnished by the political and economic system (2.0), the demand signals (14.0) received, and the institutional linkages (11.0) in place. If training policies are unclear or resources inadequate, or information flows and linkages weak or ineffective, the internal efficiency of the training system will be threatened.

1.30 By the same token, the external efficiency of VET will be influenced by management in the employment system and its determination of how enterprises will use skilled labor and other resources along with technology in the production process. The effectiveness of firm management in this task will be influenced by externally determined economic policies and resources (10.0), non-governmental resource flows (i.e., revenue to the firm) (17.0), supply signals received through the labor market (13.0) and other formal and informal linkages between production and training (11.0, 16.0, 14.0).

METHODOLOGY AND DATA

1.31 The taxonomy was used to select a sample of 121 of the 213 industry VET components in Bank-assisted investment projects financed between FY63 and FY86. These were chosen to be representative across country income levels, the four selected training modes and World Bank regions.[6/] The conceptual model was used as the basis for an analysis instrument, which was in turn used to gather and organize information on the selected components. Data were drawn primarily from Bank Appraisal and

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6/ A detailed discussion of the methodology may be found in Annex I.

Completion Reports, and sector studies, augmented by interviews with Bank project staff for selected countries.

1.32 Limitations in the data inevitably led to selectivity in applying the elements of the conceptual model. In particular, detailed data on the operation of labor markets and employing enterprises was absent from the documentation. Information on the components of training systems (especially on student and teacher characteristics) was rarely available. Thus the analysis that follows, while broadly structured around the elements of the systems model, does not seek to address all elements. However, the variables that are addressed were developed from this conceptual basis.

1.33 Finally, the study has informed by a comprehensive review of the literature on vocational education and training (Dougherty, 1989 forthcoming), providing a broader context in which the implications of World Bank experience can be interpreted.

II. Characteristics of the Investments

2.01 Projects with VET components performed, in general, as well as those directed at other subsectors of education. The dollar volume of the projects and the enrollment capacity of the institutions supported varied directly with the income level of the country of investment. Overall, projects in Asia were larger, and had the best institutional performance ratings. Evidence on investment costs per place created indicates roughly comparable costs per graduate for the secondary and nonformal institutions that train skilled workers. Costs for technician training at post-secondary levels, and for teacher training, were higher than for secondary and nonformal institutions. Finally, the proportion of investment devoted to civil works has declined over time, with corresponding increases in expenditures for furniture and equipment and, to a lesser extent, technical assistance.

THE PROJECTS

2.02 The size of the projects from which sample components were drawn varied from $3.1 million (Chad II) to $700 million (the Korea Sector Program for Higher Technical Education).* Most notable is the much smaller size of projects and VET components in low income countries and in Africa (see Tables 1 and 2). As would be expected, the average project and VET component cost increased with the income level of the country. By region, the average project cost was highest in Asia ($90.58 million or $61.56 million excluding the Korea sector program), followed by EMENA , LAC, and Africa.

2.03 VET components in Africa represented on average a much smaller share of total project costs than those in other regions. This reflects the small size of the investments and the greater tendency to package these with components that supported other aspects of the education system.

2.04 Project costs increased over time, from an average of $18.13 million for the years 1963-70, to an average of $36.09 million for the years 1971-78, and finally, an average of $87.03 million for the years 1979-86. Project costs also increased over time across regions, with the exception of Africa, where only one project was implemented in the 1963-70 time frame, at a cost of $19.10 million. The average for Africa in 1971-78 dropped to $10.33 million and increased again to $48.34 in 1979-86.

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* A list of the projects and components analyzed may be found in Annex II.

Table 1: Sample Project and Component Cost and Size,
By Income Level, All Projects

	Total # Projects	Total Project Cost Planned	Average Project Cost	Total Loan/ Credit (SAR)	Average Loan/ Credit	Total # VET Components	Total VET Component Cost	Average VET Component Cost
Low	16	578.31	36.14	355.50	22.22	23	314.49	13.67
Lower-Middle	36	1683.09	56.10	942.30	26.18	63	1395.11	22.14
Upper-Middle	24	2431.53	101.31	930.10	38.75	35	1213.62	34.67
TOTALS	76	4692.93	61.75	2227.90	29.31	121	2923.22	24.15

Table 2: Sample Project and Component Cost and Size,
By Region, All Projects

	Total # Projects	Total Project Cost Planned	Average Project Cost	Total Loan/ Credit (SAR)	Average Loan/ Credit	Total # VET Components	Total VET Component Cost	Average VET Component Cost
Africa	16	478.10	29.88	283.10	17.69	26	180.10	6.93
Asia	22	1992.67	90.58	792.10	36.00	34	957.08	28.14
EMENA	25	1548.81	61.95	855.50	34.22	45	1274.21	28.31
LAC	13	673.35	51.79	297.20	22.86	16	511.83	31.98
TOTALS	76	4692.93	61.75	2227.90	29.31	121	2923.22	24.15

Project Performance

2.05 There were 43 completed projects in the sample, many with both VET and general education components. For these, average institutional performance as judged in Project Completion Reports for the project as a whole varied relatively little, and then more by region than by income level. (Tables 3 and 4). The overall implementation performance for these largely VET projects (2.32) is virtually identical to the average rating (2.31) for a different subset of 43 projects supporting all types and levels of education for which completion reports were published in FY84 and FY85 (Johanson, et.al., 1986).

Table 3: Project Size, Cost and Performance, By Income Level, Completed Projects

	Total # Projects	Total Project Cost Planned	Actual	Total Loan Credit (SAR)	Actual	Average Total Cost Overrun (Underrun)	Average Time Overrun (Underrun) in Months	Average Institutional Performance*
Low	6	99.25	100.17	63.80	61.93	.15	26.67	2.16
Lower-Middle	19	475.56	583.37	270.40	243.39	5.67	33.78	2.31
Upper-Middle	18	1791.77	1644.27	618.20	447.91	(8.19)	32.44	2.38
TOTALS	43	2366.58	2327.81	952.40	753.23	(0.90)	31.44	2.32

*1 = Poor, 2 = Fair, 3 = good, 4 = excellent

Table 4: Project Size, Cost and Performance, By Region, Completed Projects

	Total # Projects	Total Project Cost Planned	Actual	Total Loan Credit (SAR)	Actual	Average Total Cost Overrun (Underrun)	Average Time Overrun (Underrun) in Months	Average Institutional Performance*
Africa	10	133.30	158.74	92.00	88.47	2.54	29.50	2.10
Asia	12	1196.44	1161.77	344.20	340.58	(2.89)	27.50	2.75
EMENA	12	641.95	638.92	346.00	155.37	(0.25)	29.67	2.25
LAC	9	394.89	368.38	170.20	168.81	(2.94)	41.22	2.11
TOTALS	43	2366.58	2327.81	952.40	753.23	(0.90)	31.44	2.32

*1 = Poor, 2 = Fair, 3 = good, 4 = excellent

2.06 Overall, average actual project costs were very close to average planned costs -- there were cost underruns of only 1.6% for all projects ($38.77 million). All projects experienced time overruns, from 3 months for Guinea I and Indonesia I to 100 months for Ecuador I (which has the distinction of being second in line for longest time overruns among all Bank education projects). The overall average completion delay (31.44 months) is roughly the same as that of a sample of 21 primary education components financed between FY72 and FY81 -- 32.4 months (Romain, 1985).

2.07 In summary, for completed projects, Asia had the most successful project implementation on average with a high institutional performance level (2.75), relatively modest time overruns (27.5 months on average), and cost underruns of 2.9%. EMENA followed with a lower institutional performance rating (2.25), cost underruns of 0.5% and time underruns of 29 months. However, EMENA's institutional performance rating is higher (2.63) and its cost underruns become overruns (25%) if the four troubled Algeria projects are eliminated from consideration.

2.08 Average institutional performance in the LAC region was 2.1, and cost underruns were 6.7%, but time overruns were quite high at 41.2 months (although if Ecuador I is excluded, this drops to an average of 30.1 months). Projects in Africa had a similarly low institutional performance rating, on average (2.1), the highest cost overruns (19%) and, on a positive note, the lowest average time overruns (27.5 months). It is notable that the range among projects for these project data was not great -- between 2.1

and 2.75 for institutional performance, and between 27.5 and 41.2 months for time overruns. The range in cost overrun figures was wider (6.7% to 19%).

2.09 Performance across income levels was mixed. The lower-middle and upper-middle income level countries were similar, on average, in terms of institutional performance (2.42 and 2.39 respectively) and time overruns (32 and 32.4 months respectively). There were greater differences between the two in terms of cost performance. Lower income countries had high overruns of 23%, whereas the upper-middle income countries had cost underruns of 8.27% (or 6.8%, excluding Korea). The low income countries had a lower institutional performance rating (2.16), but were completed closer to planned costs (1% overrun), and with smaller time overruns (26.6 months) than the middle income countries.

COMPONENTS AND INSTITUTIONS

2.10 What was financed in these projects? The data support analysis of the number and size of institutions supported, by mode income level and region; the average planned total investment cost per place; and the distribution of costs by category of expenditure.

Size of Institutions Supported

2.11 Overall, the total number of places appraised for 1,329 project institutions was 672,558 with an average of 506. Post- secondary and secondary institutions were the largest, more than twice the size, on average, of nonformal training centers (Table 5). These latter, of course, often use a training place several times during a year, and the secondary and post-secondary institutions typically run formal two and three year courses. Thus size does not reflect output capacity. Teacher training institutions were on average slightly larger than nonformal centers.

2.12 EMENA had the smallest average institutional size at 377. This can be explained partially by the predominance of nonformal institutions. Many of these address equity issues by providing training in small communities and rural areas, both through vocational training centers and mobile training units. Nonformal institutions in EMENA were very small, with an average of 287 places (544 institutions to provide 156,318 places) as were teacher training institutions, with an average of 435 places (13 institutions to provide 5,655 places). Secondary institutions were much larger with an average of 1,133 places (39 institutions to provide 44,170 places) as were post-secondary institutions with an average of 1,041 (28 institutions to provide 29,136 places).

2.13 Africa had the second smallest institution size, on average, with 426 places. More than 60% of these institutions were secondary schools; these were the smallest of this mode across regions. The size of these institutions reflects the relatively small populations and modern sector employment markets in Sub-Saharan Africa countries. Moreover, many of the training institutions were established in locations where future industrial

development was anticipated (Chad II, Secondary; Cameroon II, Secondary; Tanzania VI, Teacher Training; Burundi II, Secondary; Zaire II, Secondary, Ethiopia VI, Teacher Training). In such circumstances, with relatively uncertain employment prospects, small institutions made sense. Africa's teacher training institutions were smallest, followed by nonformal institutions, secondary schools, and post-secondary institutions.

Table 5: Average Size of Institutions Supported, By Mode and Region

Region	Mode				Overall Sector Averages
	Secondary	Post-Secondary	Non-Formal	Teacher Training	
Africa	475	810	308	281	426
Asia	1295	930	665	318	837
EMENA	1133	1041	287	435	377
LAC	730	591	75	320	482
Overall Averages	843	936	319	359	506

2.14 LAC follows with an average institution size of 482 places (372 institutions to provide 179,148 places). The region had very small nonformal institutions; size increased progressively for teacher training, post-secondary and then secondary institutions.

2.15 Asia had the largest planned institution size on average, with 837 places. Many were located in areas of high industrial density; several were regional training centers or central workshops areas serving many schools (Indonesia). It was mainly the post-secondary and secondary institutions which brought up the average in Asia. Nonformal institutions were smaller than either of these. Teacher training institutions were relatively the smallest among the four modes.

2.16 There is a clear parallel between the income level of the country and the average size of the institutions: low income countries had the smallest institutions, followed by lower-middle income countries, and upper-middle income countries (Table 6).

Table 6: Average Size of Institutions Supported, By Mode and Income Level

Income Level	Mode				Overall Sector Averages
	Secondary	Post-Secondary	Non-Formal	Teacher Training	
Low	334	868	228	273	341
Lower-Middle	779	902	305	405	379
Upper-Middle	881	990	383	333	663
Overall Averages	843	938	319	346	506

2.17 This suggests that stronger economies with larger modern sectors have higher perceived demand for VET graduates.

Planned Costs Per Place

2.18 Given data on places supported and disaggregated cost data for the components in the sample, it is possible to derive crude indicators of the average total investment cost per place.

2.19 Interpreting cost comparisons across countries and training modes for projects spanning two decades, on the other hand, presents nearly insurmountable methodological problems. Input prices vary significantly over time, and among countries. Some projects construct new facilities; others rehabilitate existing ones; many do both. The instructional program of an institution of a given mode in one country can and does vary significantly from that of an institution in the same mode in another country, with important cost differences. Currency exchange rates differ. Political and natural disturbances cause significant delays and increase (or decrease) costs.

2.20 In addition, the cell sizes for sampled components are, in some cases, quite low: post-secondary for Africa (1) and LAC (2); teacher-training for LAC(1); post-secondary for low income countries (2); teacher training for upper-middle income countries (3). This latter cell is heavily influenced by two components in Algeria which were intended to create 1500 places at a planned total cost per place of $28,000.

2.21 This being said, the planned total investment cost per place has been calculated for the 114 components in the sample for which complete data were available. These crude figures give some notion of the ways in which costs have varied across regions, modes and country income levels (Tables 7 and 8).

2.22 Even given the caveats, it is instructive to compare investment costs for secondary and nonformal institutions. As noted, the labor market outcomes for graduates of these two modes are generally similar. Overall, nonformal places were on average a little less than twice as expensive as secondary places. Given that, on average, nonformal courses last a year or less, and secondary courses two to three years, it is reasonable to estimate that the investment costs per graduate are comparable, and perhaps somewhat less for nonformal graduates. However, significant variations in this ratio across regions indicates that considerable caution must be used in interpretation.

2.23 To control for input price differences and currency fluctuations, these relative cost ratios were checked by comparing total investment unit costs in projects that supported two or more kinds of training institution. There were 34 of these; complete data were available for 31. These comparisons confirmed the 2:1 investment cost ratio of nonformal to secondary places.

2.24 There was considerably less variation in both total investment and physical costs per place for secondary and post- secondary components than for nonformal and teacher training. This suggests that the design of investments for these formal education institutions has been somewhat more standardized across regions. Non- formal institutions, and teacher training programs, exhibit considerably more difference in design and, hence, per place costs.

2.25 Average appraised total investment costs per place varied greatly among the regions (Table 7). Africa had by far the highest average planned cost per place, although this decreases to $6,931 per place if the costly teacher training components are eliminated from the analysis. Africa is followed by EMENA and Asia. LAC had the lowest average planned cost per place at $2,857.

2.26 By income level, average appraised per place costs were highest in the low-income countries (Table 8). This is heavily influenced by the very high per place costs for nonformal components and teacher training.

Table 7: Average Planned Total Investment Cost Per Place
By Mode and Region

All Components
(US Dollars)

Region	Mode				Overall Regional Averages
	Secondary	Post-Secondary	Non-Formal	Teacher Training	
Africa	3,837	3,975	21,959	30,064	8,458
Asia	1,065	7,368	4,040	9,816	4,041
EMENA	6,448	10,233	4,017	11,187	5,416
LAC	2,315	3,365	10,900	12,625	2,857
Overall Averages	2,691	8,053	4,521	12,951	4,346

Table 8: Average Planned Total Investment Cost Per Place,
By Mode and Income Level

All Components
(US Dollars)

Income Level	Mode				Overall Income-level Averages
	Secondary	Post-Secondary	Non-Formal	Teacher Training	
Low	4,874	2,099	7,342	29,665	5,655
Lower-Middle	3,817	9,867	3,074	7,594	4,178
Upper-Middle	2,321	10,043	15,134	19,577	4,288
Overall Averages	2,691	8,053	4,521	12,951	4,346

2.27 Economies of Scale: A reasonable hypothesis is that at least some of the variation in these unit costs can be accounted for by economies of scale. Other things being equal, larger institutions should have lower unit costs. Average institutional size and average total investment costs per place, by income level, region and mode, are shown in Table 9.

Table 9: Average Institutional Size and Unit Total Investment Costs Per Place, By Mode, Region and Income Level

	Secondary		Post-Secondary		Nonformal		Teacher Training	
	Average Instit. Size	Average Unit Cost	Average Instit. Size	Average Unit Cost	Average Instit. Size	Average Unit Cost	Average Instit. Size	Average Unit Cost
Income Level								
Low	334	4,874	866	2,099	228	7,342	273	29,665
Lower-Middle	779	3,817	902	9,867	305	3,074	405	7,594
Upper-Middle	881	2,231	990	10,043	383	15,134	333	19,577
Region			Region		Region		Region	
Africa	475	3,837	LAC	591	3,365	LAC	75	10,900	Africa	281	30,064
LAC	730	2,315	Africa	810	3,975	EMENA	287	4,017	Asia	318	9,816
EMENA	1130	6,448	Asia	930	7,368	Africa	308	21,959	LAC	320	12,625
Asia	1295	1,065	EMENA	1041	10,233	Asia	605	4,040	EMENA	435	11,187

2.28 A clear inverse relationship between average institutional size and average total investment cost per place emerges only for secondary vocational schools by the income level of the country. A similar, but less strong relationship for secondary schools exists across regions, with the EMENA unit costs diverging from the pattern. For post-secondary institutions, there is a consistent direct relationship by income level and by region: larger institutions have higher unit costs. There is no clear direction for the relationship for nonformal and teacher training institutions.

2.29 These data further support the possibility that formal institutions, particularly secondary schools, have tended to follow a more standard design (paragraph 2.24).

2.30 Overall, these analyses suggest that economies of scale have operated to reduce unit costs for secondary components only. Most of the variation in investment costs are thus likely to be explained principally by specific design features such as provision of boarding places in Africa, or the relative costs of civil works and equipment in any particular investment.

Categories of Expenditure

2.31 Total project investment in civil works has been highest for post-secondary institutions, in upper-middle income countries, and in the EMENA region, with 68%, 60% and 64% of expenditures respectively supporting construction. Furniture and equipment costs have been highest for nonformal institutions (44%), middle income countries (39%), and in the Asia and LAC regions (42%). Technical assistance as a proportion of total investment has been significantly higher in Africa (12.3% planned, 8.7% actual). See Table 10.

Table 10: Categories of Expenditure, By Mode, Region and Income Level, Completed Components*
(percentages of total)

	Civil Works		Furniture & Equipment		Technical Assistance		Other	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Mode								
Nonformal	48	48	44	44	06	07	-0-	01
Post-secondary	60	68	31	26	03	02	06**	03**
Secondary	60	55	38	42	02	02	01	01
Teacher Training	57	58	32	30	11	12	-0-	01
Income Level								
Low	40	44	22	23	13	08	25**	25**
Lower-Middle	48	46	42	40	10	12	01	03
Upper-Middle	59	60	38	39	02	02	01	-0-
Region								
Africa	54	59	31	29	12	08	02	04
Asia	50	50	43	42	03	04	03**	04**
EMENA	64	64	31	32	03	03	02	01
LAC	54	55	42	42	03	03	-0-	-0-
TOTALS (%)	56	56	38	38	04	04	02	02

* Data available for 71% of completed projects, 67% of secondary components, 64% of post-secondary components; 76% of nonformal components, and 57% of teacher training components.

** Almost entirely due to unallocable costs in Bangladesh I post-secondary component.

2.32 Higher proportions of the investments were allocated to technical assistance for nonformal and teacher training components, in low and lower-middle income countries, and in Africa.

2.33 These patterns have changed over time to give greater emphasis to furniture and equipment, with a lesser rise in technical assistance (Table 11).

Table 11: Changes in Allocations by Category of Expenditure, Two Time Periods, By Region (percentage of total)

	FY71-75				FY76-82			
Region	Civil Works	Furniture & Equipment	TA	Other	Civil Works	Furniture & Equipment	TA	Other
Africa	62	27	06	05	53	31	10	06
Asia	54	38	01	07*	47	45	07	01
EMENA	75	22	04	01	59	38	03	-0-
LAC	61	33	06	-0-	54	43	03	-0-
TOTALS (%)	63	30	03	04	54	42	04	01

* Largely for unallocable expenditures in Bangladesh I.

2.34 The shift away from civil works towards furniture and equipment, and to TA, reflects increasing attention to rehabilitation of existing systems in EMENA, and to a lesser extent in Asia and LAC. The increases in TA for Africa and Asia are due to institution-building components in later projects.

2.35 These trends are the same as those identified by Schwartz (1989, forthcoming) for all VET investments for two different time periods. His analysis shows civil works accounting for 46% of total project cost for projects financed in FY79-81, and declining to 26% in FY84-86. Furniture and equipment costs increased from 22% to 30%, and technical assistance from 3% to 10% in the same two periods.

SUMMARY

2.36 The size of both the projects and the components financed during this period varied directly with the income level of the investment. The smallest projects and components were in Africa, reflecting not only the predominance of low income countries in the sample but also relatively small populations. The largest projects were in Asia, with a higher proportion of middle income countries and with larger populations. VET components in Asia, EMENA and LAC were similar in size.

2.37 These VET projects performed as well as other education sector investments. Project performance, as measured by time overruns and institutional performance varied relatively little, and then more by region than by country income level. By region, the best performance record was achieved in Asia and EMENA, followed by LAC. Overall, the projects had a very slight cost underrun. On completion delays the projects compare favorably with primary education projects financed during the period; the overall institutional performance rating is identical to the average for all education sector projects completed in FY84 and FY85.

2.38 On average the institutions supported were smallest in low income countries, and in EMENA. Total investment costs per place created were significantly higher in Africa, and in low income countries. These costs varied considerably across modes, income level and regions; the data indicate, however, that the investment cost associated with producing a skilled worker is roughly equivalent in secondary and nonformal institutions. Teacher training places have been most costly overall. Cost differences can be explained by economies of scale only for secondary institutions across income levels.

2.39 Finally, these investments have provided increasing support for furniture and equipment, and for technical assistance. These patterns are consistent with recent emphasis on rehabilitation of existing training capacity and on institutional development.

III. Investment Design

3.01 Investment in nonformal training has increased in middle- income countries, and in low-income countries other than those in Sub- Saharan Africa. This trend reflects a pattern of investment design that has increasingly emphasized the development of national vocational training systems built around nonformal training modes. Such systems have come to dominate investment outside of Sub-Saharan Africa, and are beginning to be applied there as well.

3.02 The evolving patterns of design are reviewed in this chapter, beginning with the justification and planning approaches on which the investments have been based. The elements of project strategy are then analyzed: objectives, linkages between training and employment, demand generation, curriculum development, testing and certification, staff development and innovations in training delivery. The subsequent chapter provides an overview of the development of national systems, with attention to policy evolution, financing and the development of planning and management capacity.

JUSTIFICATION AND PLANNING

3.03 The economic justification for these investments was generally based on various scenarios for industrial growth. Other rationales included providing manpower support for specific large-scale infrastructure development programs, sub-sector manpower needs, out- migration of skilled labor and remittance earnings, replacement of expatriates in the workforce, and equity considerations.

3.04 In Latin America and the Caribbean, economic strategies emphasizing growth of manufactured exports were the basis for investments in El Salvador, Dominican Republic, Barbados, Uruguay and Brazil. In the latter case improving the level of technology in manufacturing was also an explicit rationale. Similar justifications supported investment in Korea and Malaysia.

3.05 Anticipated industrial growth fueled by petroleum exports figured prominently in the justifications for investments in Ecuador, Indonesia, the Ivory Coast and Cameroon. Sharp drops in oil prices forced readjustment of economic strategies in these countries, with consequent recurrent budget constraints on VET.

3.06 Projections of farm mechanization and large hydro-electric system construction justified expansion of the supply of skilled workers in Uruguay. Free-standing sector training systems for the construction industry were justified in Sri Lanka and Indonesia in large part to meet demand stemming primarily from government-financed construction, and to a

lesser extent Middle East labor markets. In the case of Indonesia, it was noted that half of domestic construction contracts were being awarded to foreign firms.

3.07 A major factor in the economic justification was out-migration of skilled workers from Egypt, Jordan, Pakistan, Bangladesh and Indonesia to the oil-based economies of the Middle East. By the time of the seventh Pakistan project, worker remittances were the largest single source of foreign exchange. A significant portion of the training investment supported the continuing supply of such labor. The return of workers as the oil-exporting economies contracted led to labor market instability in the 1980s. In Jordan, it produced an oversupply of workers in certain skills categories that, together with continuing demand for skilled workers, led the government to establish a labor market information system and re-orient the number and size of courses of different kinds in vocational training centers. In contrast, in Pakistan, returning workers appear to be easily absorbed by the economy, with many choosing to establish their own businesses (Pakistan Sector Study, 1988).

3.08 The most prominent rationale in the low income countries of Sub-Saharan Africa was the need to replace costly expatriate managers and skilled workers. The same rationale was important in Morocco and Algeria. Economic justifications for the low-income countries of Sub- Saharan Africa were also based on projections of growth. Economic analysis tended to be less complex in these smaller economies, and to be too optimistic. In the Cameroon, for example, a secondary vocational school was built to provide skilled workers for intended industrial expansion in the northern region. Industrial development was delayed, and graduates had to leave the region to find employment.

3.09 Equity Justifications: Only one of the sample of components was justified principally on equity grounds: investment in boarding places for Tanzanian nonformal centers and technical secondary schools was intended specifically to increase the access of rural clients to the former and women to the latter. Increased access for rural groups to skills training was, however, an ubiquitous secondary justification: it was mentioned in connection with at least one (but not necessarily each) component in each country in the sample. Access for women figured prominently in the justification of seven of the 76 projects; most of these were in the EMENA region (Jordan, Turkey, Egypt, Pakistan, YAR, Barbados).

Planning

3.10 Virtually all of the sampled component investments were planned on the basis of projected manpower requirements. In the majority of cases these were forecast from admittedly inadequate data, with appropriate caveats regarding the indicative nature of the estimates. Such estimates were then compared with the output of existing training systems and investments rationalized as (usually partially) closing the gap. In a majority of projects these estimates were made by Bank staff or UNESCO consultants.

3.11 In a number of cases manpower requirements were derived not from global forecasts, but from enterprise surveys (Ecuador I, Uruguay I, Cameroon II), and other indicators of employment needs. In this last category were industrial labor force growth, high demand to sit for trades tests and requests for manpower from specific industries (Kenya V). Use of such indicators has increased, particularly in later sector work.

3.12 Benefit/cost ratios were calculated as part of the justifications for the technical colleges in Turkey II and the vocational training centers in Morocco VI.

3.13 The data available from project evaluations do not permit a comparison of the relative effectiveness of these various planning approaches. Few addressed the issue of actual manpower supply and demand, and the use of enterprise surveys and other shorter-term indicators of demand is too recent to have been evaluated. However, the SAR for Egypt IV noted that manpower planning is hampered by the rapidity of social and economic change, a general lack of useful data, a lack of coordination between ministries and agencies, and the effect of government recruitment and wage policies. Similarly, sector analyses in Jordan and Tanzania demonstrated the inaccuracy of longer- term manpower requirements forecasting. These difficulties have also been documented elsewhere in the literature (Dougherty, 1988 forthcoming).

3.14 Labor market factors received very little attention in the bulk of these investments. However, these became more important in later projects in middle income countries and sector-specific training operations. The occasional use of enterprise surveys is noted above (paragraph 3.11). The Sixth Morocco project was in part justified on analysis of occupational trends from census data showing increases in private sector employment of skilled workers and stagnation in government hiring. Census data on employment was also used in the Turkey II Industrial Training Project, which is also partially addressed to falling worker productivity, and includes both skill and management training. Free standing training projects designed to support one sector were justified on employment demand analyses for public and private enterprises (Sri Lanka I and II, Indonesia Public Works Manpower Development).

Sector Work

3.15 Sector analysis has made important contributions to the development of national training systems across all regions. As shown in Table 12, prior sector work was an important basis for policy and institutional development investment in sixteen countries.1/

1/ A more detailed analysis of sector work may be found in Annex III. Sector studies analyzed are listed in the Bibliography.

Table 12: Relationship of Sector Work To Subsequent Investments

Region	Total Number of Countries	Studies Focused on Policy and Institutional Development		Later Focus on Science and Technology	No Sector Work or Little Policy Content
		During Investment Program	After Last Investment		
Asia	5	4		2	1
EMENA	8	4	1	2	3
LAC	8	4	1	1	3
Africa	13	4	3		6

3.16 Table 12 addresses both the timing and the major impact of sector analysis in country investment programs. Studies during the investment program that contributed directly to policy and institutional development components in subsequent investments are identified, as are analyses which have come after the most recent investment. The incidence of recent studies which focus on science and technology development is noted. The last column shows the number of countries where sector work was either absent, or had relatively little policy or institutional development content.

3.17 Sector work was not a pre-requisite to institution-building investment. However, it was associated with strong and generally successful efforts in larger middle income countries (Korea, Indonesia, Malaysia,

Mexico, Brazil, Jordan, Turkey. Morocco). In Bangladesh and Pakistan, major sector work focused on policy and institutional issues has been completed since the most recent investment project, and should contribute substantially to subsequent policy dialogue.

3.18 An explicit focus on science and technology development has emerged in later stages of analysis investment in five middle income countries (Korea, Malaysia, Brazil, Jordan and Turkey). Linked with earlier investments in skilled worker and technician development, these initiatives represent important directions for the improvement of industrial productivity that build on established technical education systems.

3.19 Heavy emphasis on sector analysis in Asia, Latin America and EMENA is notable in comparison with Africa. In the four of the five African countries where current projects are assisting the development of national training systems, or contributing to institutional development at a somewhat lower level, sector analysis played an important part in shaping the investment (Ivory Coast, Cameroon, Ethiopia and Senegal). Prior sector work in Kenya is less directly related to policy and institutional issues. As these projects are underway, the contribution of sector work to successful policy and institutional development cannot be judged.

3.20 In three African countries sector work carried out subsequent to the most recent investment has begun to lay the groundwork for policy and institutional development (Chad, Zaire and Burundi). Thus, in sector work, while investment programs in Africa are at an earlier stage of development, there are indications that progress is being made. The value of sector analysis in other regions suggests that this current effort should be strengthened and accelerated.

STRATEGIES

3.21 A project strategy is a particular combination of objectives (ideally derived from the goals of broader sector plans) and action elements thought necessary for those objectives to be achieved under given circumstances. The objectives for the sample of components are analyzed below, together with six key action elements: 1) linkages between training and employment; 2) generation of demand for places in VET institutions; 3) curriculum development; 4) testing and certification; and 5) staff development;

Objectives

3.22 Analysis of the multiple objectives of sample components indicates that, in general, project investments in Africa were the least -- and nonformal components the most -- complex in terms of intended outcomes. Somewhat greater emphasis on institutional development objectives was found in middle income countries. Over time, the objectives of investments shifted to give greater emphasis to upgrading worker skills and to increased access to vocational training for disadvantaged groups.

3.23 The percentage distributions of the 505 objectives stated for 121 components across regions, modes and country income levels are shown in Table 13. Data were collected on two kinds of objectives. The first, "objectives for clients," includes those which are directly related to various outcomes of training for students. The second, "objectives for systems development," includes objectives related principally to institutional development for the VET system.[8/]

3.24 In interpreting these data, it is important to recognize that the percentages reflect the share of all objectives of a given type that fall into a particular category, and not the proportion of components with a given type of objective. For example, the data indicate that 41% of the objectives for African components were classified as "manpower expansion" objectives. All but one Africa component had such an objective. Thus the data serve as overall indicators of the degree of emphasis given to objectives of a given type. To take yet another example from Africa, the data indicate equal and primary attention to manpower expansion and improving the quality of training. Upgrading worker skills received about 10% of the emphasis, and improved access for disadvantaged groups about 05%.

3.25 African components had, on average, fewer objectives, reflecting the relatively small size of components and the greater proportion of secondary vocational school components with relatively simple designs. Components in LAC, Asia and EMENA had more objectives, with marginal differences between them overall. Each of these regions invested more heavily in relatively more complex nonformal modes. On this particular indicator, LAC also gave more emphasis to systems development objectives.

8/ The list of objectives was developed from the VET literature and from preliminary analysis of a set of SARs, and refined through pre- testing of the questionnaire.

Table 13: Percentage Distribution of Component Objectives By Region, Mode and Country Income Level

Type of Objective	Region				Mode				Income Level		
	Africa	Asia	EMENA	LAC	Secondary	Post-Secondary	Non-Formal	Teacher Training	Low	Lower-Middle	Upper-Middle
Objectives for Clients											
Manpower Expansion	41	34	40	33	39	48	30	49	34	37	39
Improve Training Quality	42	35	33	35	38	46	30	41	37	34	37
Reduce Youth Unemployment	-0-	05	03	04	01	02	05	-0-	05	03	02
Reduce Other Unemployment	02	04	03	02	01	-0-	05	-0-	05	02	04
Reduce Pressure on Higher Education	-0-	02	02	02	04	-0-	01	-0-	-0-	01	05
Upgrade Worker Skills	10	07	10	24	09	-0-	17	08	14	12	08
Change Attitudes Towards Blue Collar Work	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
Improve Access of Groups	05	12	10	-0-	08	04	11	03	05	11	05
Subtotal (%)*	100	100	100	100	100	100	100	100	100	100	100
(n)	(59)	(94)	(110)	(46)	(77)	(46)	(149)	(37)	(59)	(166)	(84)
Average Per Component	2.27	2.76	2.44	2.88	2.40	1.92	3.17	2.05	2.57	2.63	2.40
Objectives for Overall Systems Development											
Improve Policy, Planning or Analysis	31	36	32	29	30	27	37	20	30	33	31
Improve Management	28	34	27	31	23	30	30	47	30	28	32
Strengthen Linkages With Employers	39	19	39	34	43	41	27	27	28	35	34
Other	03	11	03	06	04	03	06	07	13	04	02
Subtotals (%)	100	100	100	100	100	100	100	100	100	100	100
(n)	(39)	(47)	(75)	(35)	(47)	(37)	(97)	(15)	(40)	(103)	(53)
Average Per Component	1.08	1.38	1.68	2.19	1.47	1.54	2.06	0.83	1.74	1.63	1.43
TOTAL NUMBER OF OBJECTIVES	98	141	185	81	124	83	246	52	99	269	137
AVERAGE PER COMPONENT	3.76	4.15	4.11	5.06	3.88	3.46	5.23	2.88	4.30	4.26	3.91
RATIO OF SYSTEMS OBJECTIVES TO THE TOTAL	.40	.33	.41	.43	.38	.45	.39	.29	.40	.38	.39

3.26 As noted, nonformal components addressed the largest number of objectives, both for clients and for systems development. Post- secondary components were least complex in terms of objectives; interestingly, within this smaller number of objectives these components gave a somewhat higher ratio of attention to systems development (.45).

3.27 Few differences appear in comparisons across country income levels in terms of the average number of objectives for clients. Somewhat more emphasis was given to systems development in the low and lower-middle income countries, as might be expected, leading to an inverse relationship overall between the income level and average number of objectives per component.

3.28 Objectives related to manpower expansion and quality improvement were dominant in Africa (83%), and post-secondary and teacher training components (94% and 90%, respectively). These combined percentages exceeded other regions and modes by at least 10%. Components in other regions, and supporting other modes, addressed a greater variety of objectives. Upgrading worker skills was the third most frequent objective. Its distribution indicates that it received greatest emphasis in LAC and in nonformal components, and in the lower income countries.

3.29 Objectives related to improving the access of disadvantaged groups (rural clients, ethnic minorities, women) were given more emphasis in Asia and EMENA, and in nonformal components. Relatively less attention was given to these objectives in Africa, in post- secondary components, and in lower-middle income countries.

3.30 Interesting by their comparative scarcity are objectives related to changing attitudes towards blue collar work, reducing unemployment, and reducing pressure on higher education. These objectives are often discussed as possible functions of VET. At a formal level, at least, they have received relatively little attention in Bank-supported investments in these modes.[9/]

3.31 The data indicate roughly equal attention to each of the three system development objectives overall. Less emphasis was given in Asia to objectives related to establishing linkages between employers and training institutions, and relatively more to policy, planning analysis and management. Linkages received less attention (in terms of numbers of objectives) in nonformal and teacher training components, with planning and management, respectively, receiving more. Again, no patterns of difference emerge across income levels.

9/ Somewhat surprisingly, only two of the seventy-nine diversified secondary projects supported by the Bank have had such objectives (Haddad and Conly, 1987).

3.32 Overall, the data on objectives suggest that nonformal components and components in LAC, EMENA and Asia were more complex, seeking to address more issues. African and post-secondary components were least complex. Manpower expansion and improvement in the quality of training were the dominant aims of all investments, with some attention being given to upgrading worker skills and improving access for disadvantaged groups.

3.33 Few differences are observed across country income levels. This may suggest that, in terms of the intended outcomes selected by project designers, the nature of the economy has received relatively little attention.

3.34 Changes Over Time: The data in Table 13 reflect more than twenty years of investment history. The pattern of emphasis on different objectives has changed over this period. Although the changes have been relatively small, they indicate reduced emphasis on manpower expansion and quality improvement and increased attention to upgrading worker skills and improving access for disadvantaged groups. The data, disaggregated for three time periods, are shown in Table 14. Only data for the four most frequently cited client objectives are given.

Table 14: Changes in Percentage Distribution of Client Objectives, Three Time Periods: Summary Data

Type of Objective	Time Periods		
	FY63-70	FY71-78	FY79-87
Manpower Expansion	41	39	35
Improve Training Quality	41	37	34
Upgrade Worker Skills	06	09	14
Improve Access of Groups	-0-	07	09
TOTALS (%)	88	92	92

3.35 On a regional basis, the changes are most striking for Africa and EMENA (Table 15). In both regions emphasis on upgrading worker skills and improving access to training increased over time, while emphasis on expanding manpower supply declined. LAC maintained a very strong emphasis on worker upgrading.

3.36 These shifts were most marked for nonformal training components (Table 16), where worker upgrading and improved access grew in importance to assume 30% of emphasis in terms of objectives. A similar pattern of increase is observed for secondary components. Post- secondary components changed very little in emphasis. The recent shift towards worker "upgrading" in teacher training components reflects more formal attention to in-service teacher training.

3.37 Similar analysis of the data for systems development objectives indicates a shift toward policy, planning and analysis, and to management, from the second to the third time period, and a corresponding decrease in attention to linkage development. This general pattern holds across modes and across country income levels. It reflects, primarily, the large number of components in investment sequences, in which attention in earlier projects was directed towards development of linkages, and in later projects towards system development through policy, planning and management development.

Table 15: Percentage Distribution of Client Objectives, Three Time Periods: By Region

Fiscal Year of SAR

Type of Objective	Africa			Asia			EMENA			LAC		
	63-70	71-78	79-87	63-70	71-78	79-87	63-70	71-78	79-87	63-70	71-78	79-87
Manpower Expansion	50	46	36	33	36	33	*	43	38	50	33	30
Improve Training Quality	50	41	42	33	33	37	*	41	29	50	33	35
Upgrade Worker Skills	-0-	05	15	11	03	11	*	08	11	-0-**	25	25
Improve Access of Groups	-0-	05	07	-0-	18	09	*	03	14	-0-	-0-	-0-
TOTALS (%)	100	97	100	77	90	90		95	82	100	91	90

*No projects financed in EMENA during this period that were included in the sample.
** Only one project financed in LAC during this period.

Table 16: Percentage Distribution of Client Objectives, Three Time Periods: By Mode

Type of Objective	Secondary			Post-Secondary			Nonformal			Teacher Training		
	Fiscal Year of SAR											
	63-70	71-78	79-87	63-70	71-78	79-87	63-70	71-78	79-87	63-70	71-78	79-87
Manpower Expansion	38	43	35	50	48	48	50	32	29	*	46	50
Improve Training Quality	38	41	35	50	43	48	50	30	30	-0-	46	39
Upgrade Worker Skills	09	05	14	-0-	-0-	-0-	-0-	17	17	-0-	-0-	11
Improve Access of Groups	-0-	08	10	-0-	05	05	-0-	08	13	-0-	09	-0-
TOTALS (%)	81	97	94	100	88	91	100	87	89	-0-	91	100

* No teacher training components financed in this period in the sample.

Linkages Between Training and Employment

3.38 Articulation between vocational training and employment is widely accepted as a crucial factor in the cost-effectiveness of training. It can facilitate the match between the supply of trained persons and job opportunities, and increase the relevance of vocational curricula to job skill requirements. It can also improve the ability of training institutions to adjust both curricula and the volume of training to rapidly changing labor markets.

3.39 The pattern of linkage arrangements in the completed components in the sample indicates that more attention was given to developing linkages for nonformal training institutions than for post- secondary institutions and secondary vocational schools. Moreover, the linkage arrangements for nonformal components have been much stronger in establishing the information flows and training services relationships that facilitate the demand-driven training that is responsive to changing labor market requirements.

3.40 The incidence of linkage arrangements, by mode, for completed projects is shown in Table 17.[10/]

Table 17: Incidence of Linkages, By Mode
Sample of Completed Industry VET Components, 1963-82*

Mode	Number of Components in the Sample	Percent of Components With Linkages	Percent of Components With 2 or More Links	Average Number of Linkages Per Component
Non-formal	21	76	62	2.56
Post-secondary	14	54	43	2.28
Secondary	24	63	17	1.53
TOTALS	59	64	38	2.16

* Of components initiated between 1963 and 1982 for which evaluations are available.

3.41 A higher proportion of nonformal components had at least one articulation arrangement, and these had on average a greater number of linking mechanisms. This is consistent with the general design differences between the nonformal and formal institutions, with the former generally intended for more specific occupational training, including in-service courses for workers. The relatively lower incidence of linking mechanisms for secondary vocational schools is consistent with their general role of pre-employment training combined with general education. To the extent that linkages facilitate balance between supply and demand for skills, it is also consistent with the difficulties many of these institutions have encountered in placing graduates in employment (Dougherty, 1988 forthcoming).

10/ Linkages for teacher training components are not included in this analysis. There were such linkages, both with the schools in which instructors would work and, very occasionally, with relevant enterprises. But the incidence is too small for statistical analysis.

3.42 The transition from school or training center to work is especially difficult in economies with small modern sectors and low rates of growth. In such circumstances employers are likely to have fewer incentives to invest time or resources in linkages with pre- employment training. A rough indication of the effect of different economic contexts on articulation can be taken from the data in Table 18.

Table 18: Incidence of Linkages by Country Income Level: Sample of Completed Industry VET Components, 1963-82

Country Income Level	Number of Components in the Sample	Percent of Components With Linkages	Percent of Components With 2 or More Links	Average Number of Linkages Per Component
Low	7	71	30	1.00
Lower-Middle	29	62	32	2.22
Upper-Middle	23	65	48	2.33
TOTALS	59	64	38	2.16

* Of components initiated between 1963 and 1982 for which evaluations are available.

3.43 While the proportions of components with at least one type of linkage were roughly the same, the average number of linkages increases with the level of the economy. The evaluations of these components suggest that most components in low income countries encountered greater implementation problems in general, and the establishment of linkages suffered accordingly. Low income components also had greater difficulty in achieving enrollment targets by the time of project completion, and were correspondingly less successful in meeting targets for the supply of trained graduates to labor markets. This general weakness in the supply and demand relationship may have weakened employer interest in establishing a range of linkages. Unfortunately, very little data is available on these components regarding placement rates after graduation, making it impossible to assess labor market outcomes.

3.44 Also of interest is the nature of the linkages that were attempted. Table 19 shows the incidence of nine types of articulation arrangements across the sample of components.

Table 19: Percentage of Linked Components With A Given Linkage Type, By Mode: Sample of Completed VET Industry Components, 1983-82

Type of Linkage	Mode		
	Non-Formal	Secondary	Post-Secondary
Employer Councils	50	80	71
OJT/Internships in Curricula	43	27	88
Employers Finance Training	56	-0-	14
Employer Staff As Teachers	13	07	43
Contract Training For Employers	38	13	14
Employers Provide Labor Market Information	31	20	-0-
Employers Provide Training in School or Center	06	-0-	-0-
Student Counseling & Placement Services	-0-	13	-0-

3.45 "Employers councils" have been an important mechanism for articulation for all modes. But for nonformal institutions these have been accompanied by other significant linkages, notably employer financing and contract training, the provision of training on the job as part of curricula, and labor market information. Councils for post-secondary institutions were also bolstered by other linkages, including on-the-job training and the use of employer staff as teachers.

3.46 In contrast, secondary school councils were much less likely to be supported by other linkage mechanisms. And indeed, these councils were somewhat less likely to be effective than those for nonformal and post-secondary institutions, especially in low income countries. Evaluations of these components suggest that in these cases employers had little reason to find such councils meaningful in conditions of low demand for workers, and that school administrators found it difficult to act aggressively to establish linkages given traditional views of the role of "schooling."

3.47 Training in Enterprises: Provision of training services directly to enterprises provides an exceptionally strong link between training and employing institutions. These services can range from on-the-job and evening upgrading for workers on site, to trainer training and the development of enterprise training capacity.

3.48 The development of such services was an important later stage of investment in half of the thirty-four countries in the sample (Table 20).

Table 20: Incidence of Provision of Training Services to Enterprises, By Region and Time Period

Region	Number of Countries In the Sample	Number of Countries Investing In Enterprise Training Services	
		Before FY79	FY63-86
EMENA	8	0	4
LAC	8	6	8
Asia	5	1	4
Africa	13	0	1

3.49 These services were all developed from nonformal training institutions, and in all but three countries were created as an integral part of a national training system supported by the Bank. Fourteen of the seventeen countries fall into the middle income categories. And the three low income countries (Senegal, Pakistan and Bangladesh) have relatively developed industrial sector employment. Many of these arrangements have been established in currently ongoing projects, for which evaluations are not available. However, evaluations do indicate success in Jordan, Korea and Brazil.

3.50 In sum, the evidence suggests greater attention to establishing articulation arrangements for nonformal institutions than for post-secondary and secondary institutions, in part because of the nature of nonformal training systems. Councils have been more effective when supported by a range of other articulation arrangements. And it appears more difficult to establish linkages for secondary vocational schools in low income countries. This latter conclusion is of some importance, given the prevalence of both stagnant labor markets and vocational secondary schools in many low income countries. Provision of training services to enterprises is a relatively recent, but now widespread, form of linkage with considerable potential.

Demand Generation

3.51 The low status of blue collar work in many societies has led in many cases to low regard for vocational education and training as compared with general, and especially higher, education. While none of the components sampled had as an objective changes in such attitudes, a relative few made conscious use of incentives and public information activities ("training supply signals") in an effort to attract good students to the VET system.

3.52 The most common incentives were scholarships and allowances for students, often including free or low-cost boarding. This strategy was pursued, for example, in the YAR, in Tunisia and in Morocco. Such measures were also seen as equity strategies, increasing the possibilities for disadvantaged students.

3.53 Public information campaigns to attract students were mounted in two of the components. In Egypt, these were reported to be unsuccessful. However, in recent investments in Mexico, the national training institution (CONALEP) has successfully used advertising to generate high levels of demand for training places. This innovative approach has used radio, television and press advertising aimed at improved public understanding of the quality of CONALEP training as well as employment prospects for graduates.

3.54 Perhaps the most comprehensive program of demand generation took place in Korea. To encourage able students to enroll in both technical high schools and vocational training centers, the government provided scholarships, exempted graduates scoring above 50% on the national skills

licensing examination from military service, and permitted the top 10% of secondary graduates to enter college. In addition, two national "flagship" institutions were created, a secondary technical school and an "industrial masters college" to provide in-service training in productivity, occupational safety and advanced technologies to selected senior technicians. One of the objectives for these institutions was to enhance the status of technical occupations. While VET was reported to continue to be a second choice for parents and students, these policies generated 1.5- 2.0 applicants for every VET place. Expanding industrial employment, of course, was also an important factor.

Curriculum Development

3.55 Investment in curriculum development was a nearly universal feature among sample components. The exceptions were in Africa, where five secondary components were planned with no overt curriculum development activity (Gabon II, Gambia I, Burundi II, Zaire I, Tanzania VI). Some curriculum development activity undoubtedly took place; however, in comparison with all other components, it received relatively little attention. These components were financed between FY72 and FY80.

3.56 Curriculum development in most Africa components was closely associated with reliance on expatriate instructors and teacher trainers. Much of the curriculum work was led by these resident specialists, working with counterparts, and was integrated with in- service teacher upgrading. However, with the exception of later investments in the Cameroon and Senegal, relatively little investment was made in permanent curriculum development capacity.

3.57 In LAC, EMENA and Asia the creation of institutional capacity for curriculum development was a common feature. In some cases, as in Pakistan, Brazil, Jordan and Cameroon, this capacity was developed as part of an overall national training system. In Egypt, Turkey, Mexico and Ecuador special materials development units were established. In other countries, this function was integrated with multi-function systems development and support units, such as the Korean National Vocational Training Management Agency and the Korean Institute for Research in Vocational Training; the Polytechnic Education Development Center in Indonesia; and the National Institute for Maintenance Trades Administration in Algeria. Institution-building of this type was characteristic of middle and late stages of investment programs.

3.58 Investments in these three regions were also much more likely to support curriculum development based on occupational analysis, with significant input from industry, and to employ modular curriculum approaches -- often with ILO advice and assistance. Occupational analysis, by basing training objectives on the skills required for defined jobs can lead to increased training efficiency. Only necessary knowledge and skills are taught; shorter and more focused training leads to efficiency gains; and post-training performance is more immediately productive. Partial exceptions to these approaches were found in early projects in Malaysia and

Algeria, which faced continuing difficulties with overly-theoretical curricula. These problems were later addressed through curriculum reform activities.

Testing and Certification

3.59 Standardized skills testing and certification can play important roles in VET systems. At one level, they promote labor mobility by enabling workers to establish their credentials with employers. Standard certification reduces the costs of recruitment to employers, who do not need to invest in their own testing system. At another level, they set standards of achievement that can guide curriculum development and serve as criteria for monitoring the performance of training institutions. And, as Korean experience suggests, they can provide the data on system performance essential to other important incentive policies.

3.60 While not necessarily the best approach to testing, national systems have generally been seen as the most effective place to begin the development of testing capacity and, in particular, to provide the national-level standardization that contributes to labor mobility. Table 21 summarizes, for the 34 countries in the sample, the incidence of national testing systems and of Bank support for them.

Table 21: Support for Testing and Certification Systems, Sample Countries, By Income Level

Income Level	Total Sample	With National System	Supported by the Bank	Unknown
	Number of Countries			
Low	12	4	1	8
Lower-Middle	13	10	7	3
Upper-Middle	9	3	3	6

It is likely that most of the countries listed as "unknown" did not have national testing systems during the period of the investments reviewed; it is certain that any Bank support for such systems that may have existed was incidental. Using this assumption, national testing and certification systems have been developed in just half (17) of the 34 countries in the sample.

3.61 Testing and certification systems were more prevalent and were more likely to receive Bank support in middle-income countries. Bank financing assisted in the development of national testing systems in Kenya, Korea, Indonesia, Sri Lanka, Bangladesh, Jordan, Turkey, Brazil, Uruguay, El Salvador and Ecuador. Development of these systems typically spanned several projects.

3.62 Unique among all countries in the sample, Korea instituted a national system for accreditation of post-secondary junior colleges. Coming towards the end of the investment program, this scheme sought to establish and enforce quality standards for both public and private institutions. While problems were encountered in enforcement in the early stages of the effort, the government was reported to be intent on establishing the system.

3.63 Where national systems were not put in place, investments typically supported the development of testing capacity at the institutional level as part of curriculum development efforts.

3.64 Tracer studies and other monitoring mechanisms (such as labor market surveys) received relatively little attention. Indeed. one PCR recommended against tracer studies because of implementation difficulty (Indonesia). In some countries, however, these have provided useful feedback on systems performance (Korea, Jordan), though their use is far from routine or widespread.

Staff Development

3.65 The continuing availability of an adequate number of qualified instructional staff is crucial to the efficiency and effectiveness of VET institutions, regardless of mode. Provision for teacher education or training was even more pervasive than curriculum development, with some level of investment in every country in the sample. However, the problems of teacher supply differed across regions and over time, and were addressed in several ways with varying success (Table 22).

Table 22: Factors in Instructional Staff Development, By Country

Region	In Sample	Number of Countries With: Teacher Supply Problem (unknown)	Teacher Training Institution	In-service Component	Fellowship Training	Expatriate Teachers	Teacher Incentives
Africa	13	9 (2)	5	5	5	9	3
Asia	5	4 (1)	3	5	3	0	4
EMENA	8	5 (2)	5*	6	5	2	4
LAC	8	4 (1)	2*	7	4	0	3

*Includes institutional arrangement in one country not supported as a separate project component.

3.66 Six dimensions of teacher supply and development in the countries in the sample are presented in Table 22. The number of countries for which the documents report a significant problem of teacher supply is shown, together with the number for which the documentation is ambiguous. The incidence across countries of the five most common strategic responses to the problem are also shown. These are 1) the creation of a teacher training institution; 2) provision of organized in-service training; 3) the use of fellowship training abroad for instructors on instructor trainers; 4) the use of expatriate teachers; and 5) the use of incentives of various kinds to attract and retain qualified teachers.

3.67 The problem of ensuring an adequate supply of teachers was significant in all regions, though less so Latin America. Indeed, there were only six countries where the supply of instructors was clearly sufficient without further investment. In Africa these are were Tanzania and Kenya; the EMENA country is Turkey. In all three cases the projects in the sample were appraised relatively recently (after FY79), and teacher training institutions (and in the case of Turkey, strong teacher salary incentives) were in place. The three LAC countries where significant supply problems were not reported were Barbados, Brazil, and Uruguay. In Brazil and Barbados, competitive salaries were a well-established policy. In Uruguay, budget constraints turned the government from full-time teachers to a policy of hiring part-time instructors from industry. This resulted in high quality, attractive extra income for teachers, and low costs.

3.68 Without exception the West African countries struggled throughout the period with the problem of training, attracting and retaining indigenous teachers. Notable has been the continuing reliance on expatriate teachers, despite the creation of teacher training institutions, provision of in-service training by expatriate advisors, and heavy use of fellowships to train instructors abroad. These countries have found it more difficult to provide salary incentives for VET instructors, and to provide scholarships and other incentives for teacher trainees, than have those in other regions. Salaries were increased in the Cameroon and Zaire, and scholarships for teacher trainees made available in Senegal. Even these countries continue to rely on expatriate teachers. This factor contributes significantly to the high unit costs of VET in the region, and the difficulty many governments are facing in supporting recurrent cost budgets.

3.69 The problem of teacher supply in many African countries is rendered more acute by virtue of the small population base, and consequently the small size of training institutions. The extremely high cost per place of VET teacher training in Africa must be seen in this context (paragraph 2.25).

3.70 Loss of teachers to higher paying jobs in industry and, to a lesser extent, teachers' lack of industrial experience were the principal problems addressed in Asia and EMENA. Expatriate teachers were used in just two of the 13 countries. In the YAR, the sequence of Bank investments established a vocational training system where very little capacity existed. Expatriate teachers figured prominently in the staffing of secondary, post-secondary and nonformal institutions. Through fellowship training and local in-service efforts a cadre of Yemeni instructors for the nonformal and secondary institutions began to emerge over time. A unit to train secondary instructors was established in the polytechnic created with most recent project in the sequence. Expatriate instructors continue to play an important, though diminished role. Algeria sought throughout the period to reduce reliance on expatriate instructors at post-secondary and secondary levels, creating teacher training institutions in projects financed in FY78 and FY80.

3.71 The latter of these, the National Institute for Maintenance Trades Administration is representative of the multi-purpose systems support institution that was created in a number of countries in these regions. These typically have the mandate for curriculum development, teacher education and training, and to a lesser extent research and evaluation. Other examples include the Polytechnic Education Development Center in Indonesia, and both the National Institute for Research in Vocational Training and the Technician Education Research Institute in Korea. The former is located on the campus of a teacher training college; of the latter, the first is attached to the Ministry of Labor and the second to the Ministry of Education. In smaller countries (such as Ecuador) the same function was established less formally through training and materials development centers. While
information on the effectiveness of these institutions is sparse, the data

that are available indicate that these are making important contributions to system quality.

3.72 Some problems in the quality of local and international fellowship training were encountered, but on the whole these activities appear to have been well implemented. In Malaysia, for example, early teacher training activities did not adequately address the need for practical experience or training; this was linked to similar weaknesses in the curricula of the vocational secondary schools. Instructors sent abroad in early Egypt projects encountered language problems. The need to improve quality was addressed in Indonesia by providing science and mathematics education for skilled workers entering teacher training, practical workshop training for graduates of general education, and six months of supervised practice teaching for both.

3.73 More difficult were problems of attracting and retaining qualified instructors where salaries in industry significantly exceeded those of education and training posts. In the late 1970s in Egypt, for example, skilled craftsmen could earn a salary in the private sector four times that of a VET instructor. This problem was confronted in Pakistan, Egypt, Jordan, Bangladesh, Malaysia, Korea and Indonesia. It was anticipated for the Turkey investments in the 1980s: there salaries were set to be equivalent to those of supervisors in industry.

3.74 In all cases, salaries were increased. Additional allowances and benefits, including staff housing, were provided in many countries. Scholarships were used to attract qualified persons into teacher training programs, with bonding arrangements that required post- training service in instructor posts. Instructors were recruited on a part-time basis from industry.

3.75 The most comprehensive incentive program was developed in Korea. Faced with significant loss of instructors as the industrial sector expanded, the government instituted a package of incentive arrangements. These included scholarships, exemption from military service, and bonding arrangements for teacher trainees. Teacher training was given an institutional base, and linked with curriculum development. Salaries and allowances were increased. Staff housing was provided for instructors in the vocational training centers. Teachers were recruited from those leaving military service, and on a part-time basis from industry. At higher levels in the system, efforts were made to attract overseas nationals back to teaching posts. As the sequence of investments ended shortages continued to exist due to system expansion, but on the whole the policies succeeded in providing an adequate base of instructional staff.

3.76 Salaries competitive with industry were important in assuring an adequate supply of instructional staff in Barbados and Brazil. The Brazilian national training organization (SENAI) is reported to have developed a very effective methodology for teacher training.

3.77 In two LAC countries the use of part-time instructors from industry has been a successful strategy. The experience in Uruguay has been noted earlier (paragraph 3.67). In Mexico, the extensive national nonformal training system is predicated on the use of part-time instructors from industry. This has had the advantages of good quality in highly practical training and relatively low cost. However, turnover is high, requiring the system to be capable of continuous recruitment and training. Conflict between work and training schedules during the middle of the day has also created difficulties; the response has been to adjust training schedules. In a third country, Ecuador, the use of part-time teachers in early stages of systems development was problematic due to poor training.

3.78 In sum, development of an adequate supply of qualified instructional staff requires a program that combines training with appropriate incentives, both to enter training and to remain in the teaching force. Training alone, or even competitive salaries alone, is not generally effective. Integrated support institutions can play an effective role, linking training with curriculum development and other services. The scale and degree of formalization of such institutions, of course, depends on the size of the system.

Innovations in Training Delivery

3.79 By far the larger proportion of the institutions financed followed a traditional training delivery model comprised of classroom and workshop instruction, complemented in most postsecondary and about half of the nonformal components by internships or on-the-job training in the workplace. In about a third of the countries this model was extended or reinforced in some way. Most frequent was the attempt to use mobile units to bring training to rural areas and small enterprises. Other innovations included area vocational centers to support a cluster of vocational secondary schools in Indonesia, the use of educational technology in Brazil and Turkey, and subsidized financing of private junior colleges in Korea.

3.80 Mobile Units: These were most frequently included in LAC projects (six of eight countries), and in EMENA (three of eight countries). In Asia, they have been a strategy element in Indonesia. No mobile units were financed in Africa in the components sampled.

3.81 The record indicates that mobile units can be successful, but generally are not. Effective use is found in Brazil and Paraguay. In both cases mobile units were based in decentralized regional vocational training centers with good management. The units were well utilized and, in both cases, were reported to be effective in extending training services. No data on cost-effectiveness are available.

3.82 Experience in other countries suggests that mobile units were given relatively low priority. They were reduced in number, dropped from project financing, or delayed to future projects in Indonesia, El Salvador, Ecuador, and the Dominican Republic. No information on the fate of the

mobile units is available in the remaining four countries, suggesting at least that they were not a marked success.

3.83 Indonesia Area Vocational Centers: Technical training centers were developed in the first two VET investments in Indonesia. To be located within bicycle distance of the 2-4 vocational secondary schools they would serve, these centers provided common workshop and laboratory facilities. Although some problems were encountered in developing adequate staffing in all specializations, the concept proved workable with "reasonable" unit recurrent costs.

3.84 Educational Technology: While it is likely that simple audio-visual technologies were widely used across the components, only for Brazil and Turkey does the documentation give any attention to the subject. It notes for the former that the nonformal training agency (SENAI) made good use of technology in teaching; in the later investment explicit provision for the development of audio-visual materials is made.

3.85 Private Schools: It is striking that the private training sector figured in only one of the thirty-four countries in the sample. The Korea Sector Loan for higher technical education provided a significant level of subsidized loan financing for expansion and equipping improvement in private junior colleges and colleges of engineering. This resulted in significant progress towards the achievement of MOE standards for facilities and equipment despite expanded enrollments.

SUMMARY

3.86 The economic justifications of these components rarely addressed short and medium-term labor market demand factors, relying heavily on general manpower requirements forecasts based on assumptions regarding economic growth. Where such growth did not materialize (as was the case in most low income countries), these forecasts were generally inaccurate. Most were done by Bank staff or UNESCO consultants with weak data. It is also reasonable to assume, given a parallel lack of attention to shorter-term planning, that manpower forecasting diverted attention from establishment of more flexible and responsive planning mechanisms. This is especially troublesome for secondary institutions in low income countries, where linkage development was also weak. On the positive side, many investments in low income countries addressed the need to replace high-cost expatriate manpower with locally trained workers. These efforts have been only partially successful.

3.87 Labor market factors and shorter-term planning perspectives have received greater attention in later projects in middle income countries, most of which have supported the development of national training systems based on nonformal delivery modes.

3.88 Relatively little has been done in these components to address training opportunities for women, although a general thread of concern for better access for disadvantaged groups in general runs through the investments. Improving the income of disadvantaged groups, like most employment issues, will require more than training. Attention to employment codes and practices, and management attitudes and capacity, is also needed. There is no evidence that these issues have been addressed in the components sampled.

3.89 Sector analysis has been important in middle stages of investment programs, generally leading to significant investments in institutional development in middle income countries. Increasing attention in these countries is being given to science and technology development, representing a latter stage in the evolution of VET systems. Sector work in Africa is beginning to contribute to policy and institutional development, although the frequency and policy relevance of sector analysis in the region have lagged behind that in others.

3.90 Project objectives for most training investments in the African region (the majority of which were secondary vocational school components) tended to be less complex than in other regions. Nonformal projects were guided by fairly complex objectives. Manpower expansion and improvement in the quality of training were the dominant aims of all investments; over time, the objectives of investments gave greater emphasis to upgrading worker skills and to increased access to vocational training for disadvantaged groups, especially in Asia and EMENA. Time studies also indicated a shift toward policy, planning and analysis, and to management (see next chapter on systems development), with a corresponding decrease in attention given to linkage development as these became increasingly institutionalized.

3.91 More attention was given to developing linkage relationships with employers in nonformal than in other types of training institutions. It was difficult to establish linkages for secondary vocational schools in low income countries. This is of concern due to the prevalence of stagnant labor markets and vocational secondary schools in many low income countries. Provision of training services to enterprises, a relatively new form of linkage associated with onformal centers, promises considerable potential.

3.92 Overall, few attempts were made to generate demand for training places; in cases where attempts were made to attract good students to the VET system, they were successful only in Mexico and Korea.

3.93 Investment in curriculum development was a nearly universal feature. In Africa, most curriculum development was associated with reliance on expatriate instructors and teacher trainers. In LAC, EMENA and Asia, the creation of institutional capacity for curriculum development was a common feature. In these three regions, curriculum development was more likely to be based on occupational analysis, with significant input from industry, and often employed modular curriculum approaches.

3.94 National testing and certification systems were reportedly developed in about half of the 34 countries in the sample, and were more prevalent in middle-income countries.

3.95 Ensuring an adequate supply of teachers was a significant problem in all regions, especially in West Africa where training institutions relied heavily on expatriates; this has contributed to the high unit costs of VET in the region. Problems were encountered in attracting and retaining teachers in EMENA and Asia due to salaries in industry which significantly exceeded those of education and training posts. A successful approach undertaken here by several countries was to increase salaries and offer other benefits. Indications are that integrated support institutions which link training with curriculum development and other services can make an important contribution to system quality.

3.96 Relatively little innovation in training delivery has been supported in these investments. The few examples include the use of mobile units, area vocational centers, the use of educational technology, and subsidized financing of private post-secondary training institutions.

IV. The Development of National Training Systems

4.01 Over time the objectives of these investments shifted to give more emphasis to developing the planning, management and curriculum development capacities of VET. In Latin America, EMENA and Asia sequences of project investments led in most countries in the sample to the development of national training systems, largely built around nonformal training institutions.

INVESTMENT IN INSTITUTIONAL CAPACITY

4.02 The numbers of projects with relatively high levels of attention to institutional capacity increased dramatically at the end of the 1970s (Table 23). Emphasis was judged significant when a component had clearly

Table 23: Project Investment Emphasis on Developing Institutional Planning, Management and Curriculum Development Capacity.

	FY79 and Later			FY68-79			Overall		
Region	Significant	Some	None	Significant	Some	None	Significant	Some	None
AFRICA	4	1	3	0	0	8	4	1	11
ASIA	11	-	-	1	4	6	12	4	6
EMENA	12	2	2	2	3	4	14	5	6
LAC	5	0	0	6	0	2	11	0	2
TOTALS	32	3	5	9	7	20	41	10	25

identified institutional development objectives based on an analysis of institutional constraints, and a relatively high proportion of resources (especially technical assistance) devoted to these objectives. In a number of these cases institution building was designed as a separate component. "Some" emphasis was judged to be present when institution-building objectives were less clear and based on much less analysis of constraints, and when resources were proportionally lower. In components judged to have no institution building investment there were undoubtedly some marginal activities, often through the work of technical advisors, but no formal objectives or analysis.

4.03 The shift in emphasis from FY79 onwards is striking. Also notable is that LAC, and to a lesser extent EMENA, assigned considerable importance to institution building even before FY79. Such investments began only after FY79 in Africa.

4.04 Analysis of the patterns of investment over time indicates the importance of the "cluster" sequences of several projects in a given country to institutional development.[10/] Twenty-seven of the projects judged significant in this respect from FY79 onwards were later stages of longer-term programs of two or more investments. In a number of countries (Indonesia, Korea, Jordan, Malaysia, Bangladesh, Ecuador, Cameroon) the patterns indicate gradually increasing investment in institutional capacity across the sequence of projects.

4.05 Both before and after 1979 there were a number of investments that did not incorporate institution-building strategies, and which were not followed later by projects that did. All of these were in Africa (Swaziland, Burundi, Chad, Zaire, Gabon, Guinea, Gambia). These were small investments: some were troubled (Zaire); others provided assistance on a relatively small scale to a few training institutions. It is important to note that in five larger, more industrialized African countries later projects in investment sequences did have institution-building components (Ivory Coast, Cameroon, Senegal, Kenya, Ethiopia).

The Development of National Systems

4.06 The primary result of these investments in institutional capacity has been the development of national training systems in all sample countries in LAC, Asia and EMENA. Current projects are supporting the various stages of systems development in Cameroon, Ethiopia, Senegal, Kenya and the Ivory Coast in the Africa region. While varying in detail, these systems focus on non-degree pre- employment training and in-service upgrading for workers, are administered by a quasi-autonomous organization or a strong element of the Ministry of Labor, and are financed in a variety of ways beyond direct government budgets. Some provide broad national coverage for industrial training; others are restricted to a particular

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10/ See Annex IV for this analysis.

sector. In most cases formal vocational education remains a separate function administered by the Ministry of Education.

4.07 The status of these systems as reflected in the most recent Bank SARs or PCRs is summarized in Table 24. Changes in the longer- established systems may have occurred; in some cases systems are under development in current projects. The data thus reflect policies and objectives that have been and are being supported by Bank investments, not a necessarily accurate and up-to-date assessment of system configuration.

Table 24: The Development of National Training Systems

Region/Country	Year of Initiation	Agency	Focus: National	Focus: Sectoral	Financing Policy
LAC					
El Salvador	1978	Industrial Training System (not implemented)	X		Payroll Tax Levy (not implemented)
		CENAP - National Productivity Center	X		
Dominican Republic	1979	INFOTEP	X		1% Payroll Tax Levy
Barbados	1979	National Training Board	X		0.5% Payroll Tax Levy
Brazil	1976	National Vocational Training System	X		1% Payroll Tax Levy
Paraguay	1971	SNPP	X		1% Payroll Tax Levy
Uruguay	1983	COCAP - National Vocational Training Council	X		Government Financing Student fees cover all recurrent costs

Table 24: The Development of National Training Systems
(continued)

Region/Country	Year of Initiation	Agency	Focus: National	Focus: Sectoral	Financing Policy
Mexico	1978	CONALEP	X		Government Financing Student fees cover 3% of recurrent costs Production funds in-kind contributions from
Ecuador	1966	SECAP	X		0.5% Payroll Tax Levy
Asia					
Bangladesh	1979	National Council for Skills Development	X		Government Financing
Sri Lanka	1986	National Institute for Construction Training and Development		X	Government Financing
Malaysia	circa 1980	National Council for Vocational Training (to be reorganized)	X		Government Financing Payroll Tax Levy (to be introduced) Student fees (offset by 2/3 scholarships) Study on Incentives for Enterprise Training
Korea	1976	Korean National Vocational Training Management Agency	X		Government Financing Enterprises train 10% of workforce annually or pay training levy Contract training Subsidized loans for private schools
		Korean Institute for Research on Vocational Training	X		
		Technician Education Research Institute			
Indonesia	1983	National Ministry of Public Works Training Center		X	Cost recovery from private sector firms
	1986	National Vocational Training System	X		Government Financing

Table 24: The Development of National Training Systems
(continued)

Region/Country	Year of Initiation	Agency	Focus: National	Focus: Sectoral	Financing Policy
EMENA					
Pakistan	1980	National Training Board	X		Government Financing Financing Study Initiated
Egypt	1981	Central Coordinating Committee (no institutional base)	X		Government Financing
Jordan	1976	Vocational Training Corporation	X		1% Payroll Tax (to be implemented circa 1986) Contract training
Morocco	circa 1980	Office of Vocational Training and Employment Promotion	X		Payroll Tax Levy (to be introduced)
Tunisia	1981	Office of Vocational Training	X		Government Financing
Turkey	1978	SEGEM - Industrial Training Authority (YoK: Higher Education Commission for postsecondary VET)	X		Government Financing Revolving Production Funds Student Tuition In-kind contributions from enterprises
YAR	1977 1986	Vocational Training Board National Technical Training Board (to be established) (Under Ministry of Education)	X		Government Financing
Algeria	1980	National Institute of Maintenance Trades Administration	X		Government Financing
Africa					
Cameroon	1982	CENAFOP	X		Government Financing
Senegal	circa 1979	ONFP - National Center for Vocational Training	X		Fixed Payroll Levy (to be introduced) Contract training for 25% of recurrent expenditures (estimate)

Table 24: The Development of National Training Systems
(continued)

Region/Country	Year of Initiation	Agency	Focus: National	Focus: Sectoral	Financing Policy
Kenya	-	Directorate of Industrial Training Ministry of Labor	X		Training Levy on Industry
Ivory Coast	circa 1980	-			Payroll Tax Levy (to be introduced)
Ethiopia	circa 1985	Ministry of Education	X		Government Financing

4.08 From a systems building perspective, the accomplishments of the past decade in the sample countries in LAC, Asia and EMENA have been remarkable. The institutional framework for delivery of job training for industrial employment has been established, or is being developed, in seventeen of the twenty-one countries. Training institutions with a narrower focus have been initiated in two additional countries (Sri Lanka and Algeria); Indonesia is developing both a national system and a training institution specific to the construction industry. There has been one significant investment failure. This came in El Salvador, where severe financial constraints coupled with civil disorder led to cancellation of some project elements and the inability of the government to implement the policy reforms on which system development depended. Systems development in Algeria had a troubled beginning, but seems to be underway in later investments. And the Central Coordinating Committee in Egypt lacks the institutional base that has characterized other effective systems.

4.09 Systems development has proceeded more slowly in the Africa region, currently being supported in five of the thirteen countries in the sample. However, it is notable that of the eight projects financed from FY79 onwards, five support institutional development at some level. Two of the remaining three were financed in FY79. Thus since FY80 a similar focus has evolved for Africa, although for a relatively few of the countries in which the Bank has invested in VET.

4.10 These systems have evolved largely in middle income countries. The exceptions are Senegal, Sri Lanka, Pakistan and Bangladesh. The industrial sector in the first three is large by low-income country standards, accounting for 26-29% of GDP as compared with a low income country average (excluding China and India) of 19%. Only Bangladesh falls below the average (at 14%), but has a large population and a relatively large absolute industrial employment base.

Financing

4.11 Movement away from direct government financing towards a variety of alternative financing policies has accompanied the development of most national systems. The bulk of the exceptions are low or lower-middle income countries (Bangladesh, Sri Lanka, Pakistan, Cameroon, Indonesia, Egypt, the YAR, Tunisia). Direct government financing provides the sole or major source of support for training systems in only two middle income countries: Mexico and Algeria.

4.12 Payroll tax levies have been the system of choice in eleven of the twenty-one countries. This policy failed in El Salvador, and was only partly implemented in Ecuador, due to resistance from industry. Where implemented, payroll taxes have had the advantage of providing a stable source of funding support for the development of national systems. The incidence of such taxes, however, may fall on workers or consumers. Thus, despite popular claims to the contrary, they do not necessarily represent enterprise financing for training (Whalley and Ziderman, 1989).

4.13 Student fees provide partial support to the training systems in Malaysia, Turkey, Mexico and Uruguay. In the latter case these are to cover all recurrent costs; in the others the amount of revenue is small. Contract training, sale of products and in-kind contributions from industry are additional, though apparently minor, sources of revenue.

4.14 With the exception of payroll tax levies in the LAC region, most systems are new or are currently being put in place. No assessment of effectiveness is possible outside of Latin America. Payroll tax systems there are generally reported to function effectively. The effectiveness of such schemes in raising revenues has, in recent years, led to considerable debate in Brazil as to whether these should continue to be earmarked for training or distributed more broadly across a range of social services.

4.15 The importance of stable funding for system development, and the effectiveness of payroll taxes in providing such stability, are well demonstrated. Indeed, the continuing reliance on direct government financing is the major constraint being faced by the otherwise successful national training system in Mexico (CONALEP).

4.16 Financial support for the expansion of private technical education in Korea has been noted (paragraph 3.85). The general systems for financing of the private schools is of some additional interest. Student fees have been the principal source of revenue, with the amount closely regulated by the government. Private donations, deductible from income tax, also provide some revenue. The low-level of fees relative to costs of technical education generally required the private institutions to offer less expensive programs, use less costly inputs (including teaching staff), and/or increase class size. These measures, of course, have negative implications for quality. As the Sector Program ended, the Bank recommended gradual liberalization of fees, perhaps combined with scholarship programs to counter adverse impact on equity.

Planning and Management Development

4.17 Two related planning and management capacity issues are faced in investment projects. One is project planning and implementation; the second is the development of the planning and management capacity of project institutions and of the overall system. In practice, these issues are closely inter-twined. Project Implementation Units (PIUs) carry out management development activities, they plan for new investments and they often form the initial core of the permanent institutional arrangements that manage the system as it develops.

4.18 Judgements were made on the overall planning and management effectiveness of each completed component in the sample. These judgements took into account both PIU performance and the performance, where data was available, of project institutions. It was also hypothesized that the level of financial resources would have an impact on management effectiveness. Judgements on the adequacy of component financing were also made.

4.19 These data indicate that management performance was significantly stronger in Asia, EMENA and LAC than in Africa. And, as might be expected, it varied directly with the income level of the country. There was relatively little variation across modes of training (Table 25). The level of management effectiveness was directly associated with the adequacy of financing across income levels, and for three of the four regions. No clear relationship emerges by mode.

Table 25: Component Management Effectiveness and Adequacy of Financing, By Region, Income Level and Mode

	Average Management Effectiveness Score*		Percent of Components With Adequate Financing
Region			
Africa	1.9		29
Asia	2.9		89
EMENA	2.2		48
(Without Algeria)	(2.7)		—
LAC	2.7		50
Income Level			
Low	2.2		10
Lower-Middle	2.4		52
Upper-Middle	2.5		76
(Without Algeria)	(3.2)		—
Mode (Without Algeria)			
Secondary	2.5	(2.61)	63
Post-secondary	2.2	(2.45)	64
Non-formal	2.5	(2.55)	43
Teacher Training	2.3	(2.50)	43
Overall Averages	2.4	(2.55)	55

*1 = Poor; 2 = Fair; 3 - Good; 4 = Excellent

4.20 Algeria is shown separately in the effectiveness analysis because, over a sequence of five projects with six components, an unusually large number of management problems occurred. The scores for these components significantly distort the overall ratings for EMENA and Upper-middle income countries; a lesser effect is noted by mode.

4.21 There were two main kinds of problems in the Algeria investments. One was structural. The responsibility for various components and institutions was shifted between ministries, with little cooperation and poor coordination. A major effort to decentralize administration encountered significant problems due to weak preparation. Local staff were untrained and communication systems were weak. Under these conditions procurement and construction suffered badly; major portions of the third project were cancelled.

4.22 The second was poor relationships between the government and the Bank, leading to disagreements over project implementation. Bank supervision was reported to have been weak. These difficulties appear to have been partially resolved in the current project, although the lack of a central Project Implementation Unit is raised as a concern in the SAR, as is the need for close supervision from the Bank.

4.23 Problems with financing were clearly of importance in the management of projects in the Africa region, particularly West Africa. Currency fluctuations contributed, as did the difficulties governments encountered in providing counterpart funds and adequate recurrent cost budgets. Weak funding had significant impact on maintenance of buildings and equipment. Management was also hampered by lack of qualified staff, and high staff turnover in project units. The relatively high proportion of single project investments in the region, combined with weak PIU performance, made the development of ongoing planning and management capacity difficult. These problems were addressed in later projects in the Cameroon and Senegal.

4.24 There were some positive lessons in the Africa experience. Management training was effective in strengthening project implementation in the Gambia. In Guinea an instructor training component was integrated under a single administration with two postsecondary institutions. Despite problems with PIU management effectiveness, this institutional arrangement was reported to have worked well. Good progress was made in the second Senegal project towards replacement of expatriates in the project unit with Senegalese.

4.25 The stronger management performance in Asia is associated with relatively strong financing support for components and institutions. A very strong record of management and capacity building was developed over the course of the investments in Korea. Beginning with initially strong management capacity in the Ministry of Education and relatively small investments in existing secondary and postsecondary institutions, the government was successful in developing expanded management capacity as

projects grew larger and more complex. Key elements in the record include differentiation between vocational education, managed by the Ministry of Education, and nonformal vocational training managed initially by the Ministry of Labor and eventually by the semi- autonomous Korean National Vocational Training Management Agency, with support from the Korean Vocational Training Research Institute. Strong linkages with industry throughout the period were important to management effectiveness.

4.26 In contrast, after a promising beginning with the first project, management in Indonesia deteriorated. Weak PIUs hampered efforts to develop management capacity. Linkages with employers did not develop. As in Korea, vocational education and nonformal training systems were established in separate ministries. The current manpower development project has as its major focus the development of the planning and management capacity of the Ministry of Labor and its nonformal training system. Increased authority for vocational training centers is envisaged. The construction sector training project includes measures to decentralize authority to regional training centers. Teacher training institutions in Indonesia were well managed, in large part because they were attached to existing teacher training colleges.

4.27 In the EMENA region, problems of inadequate finance affected principally Egypt and the YAR, in the former case affecting teacher supply and in the latter provision of boarding places. Strong management performance in Jordan has also rested on the establishment of a semi-autonomous management agency for the system (the Vocational Training Corporation), with clear differentiation between the formal and nonformal systems. Similar organizational arrangements have been established in Morocco, Tunisia and the YAR. Bank investments in Turkey have benefitted from the existence of strong and relatively autonomous management organizations. SEGEM, the nonformal training agency, was established with UNIDO assistance nearly a decade before the current Bank project. In Egypt, generally good management performance has been constrained because several ministries have developed their own VET systems. The need for coordination led to the creation of a Central Coordinating Committee in 1981.

4.28 Decentralization of authority to district training centers in the YAR and Turkey is reported to be successful, as is regionalization in Tunisia and Egypt. The difficulties encountered with decentralization in Algeria have been noted.

4.29 In LAC investments, inadequate funding challenged management in Ecuador, El Salvador, the Dominican Republic and Uruguay. Again, the impact was felt primarily on maintenance and recurrent budget for instructors and staff. As noted previously, in Uruguay adjustments to reduced budget resources were made successfully, in part because of competent management.

4.30 Two themes stand out in the development of systems management capacity in the LAC region: autonomous national training organizations and decentralization of planning and management. National training bodies were established in each of the eight countries in the sample. These were least

successful in early stages in El Salvador, the Dominican Republic and, to some extent, in Ecuador. In these cases weak PIUs, caused by low salaries and lack of clear authority, hampered system development. They were notably successful in Brazil, Uruguay, and Mexico. In all cases save El Salvador these institutions, at project completion, were reported to have established a workable organizational structure as the basis for future development.

4.31 Decentralization policies were implemented in Brazil, Mexico, El Salvador, Ecuador and the Dominican Republic. The general model was to devolve considerable decision-making power to regional vocational training centers with respect to curriculum planning and relationships with employers. In the three small countries decentralization was at first less than successful due to inadequate preparation of local management capacity. In Mexico and Brazil the policies have been very effective, supported by good managers and strong ties to employers.

4.32 In sum, planning and management performance is adversely affected by inadequate financing. Effective system management is associated with training agencies with a relatively high degree of autonomy and some degree of decentralization. Implementation of this latter policy, however, can be problematic if inadequate attention is given to preparing decentralized units for increased autonomy and responsibility.

SUMMARY

4.33 The pattern that emerges from the analysis of investment strategies is clear. Increasing emphasis in middle income countries has been given to the creation of national training systems. These are built largely on nonformal training modes, are well linked with employers, generally seek to develop alternative financing schemes, and incorporate professional support institutions that establish the permanent capacity for curriculum development and teacher training. Testing and certification systems provide feedback to systems managers and to employers on performance. Curriculum development is often based on occupational analysis, providing another practical link between training and employment.

4.34 Management of these systems is most often based in autonomous or quasi-autonomous training agencies, or as units of the Ministry of Labor. Many systems employ a significant degree of decentralization in order to strengthen training center responsiveness to local industry needs. Decentralization strategies, however, have encountered implementation difficulties where adequate preparation of decentralized units has not been undertaken.

4.35 Such systems may be under development in current projects in a limited number of countries in Sub-Saharan Africa. However, most of the early investments in these countries have been small projects supporting a few vocational secondary schools; in later years these have supported nonformal training centers. Sustained investment in systems development has been relatively rare. Evidence that lack of clear policy and systems

development goals continues to hamper the development of training capacity is found in the continuing reliance on expatriate instructors in many countries.

V. Performance

5.01 The evaluation of vocationally-specific education and training should ideally be carried out against a hierarchy of objectives. The ultimate objective is economic efficiency, measured by assessing the economic benefits of training (usually productivity as reflected in earnings). The next lower objective in the hierarchy is placement in employment, a necessary but not sufficient criterion for economic efficiency. At this same level employer satisfaction with graduate performance provides a weaker but useful standard. Next comes course completion or graduation. This in turn rests on a number of internal efficiency measures, such as drop out and repeater rates. Enrollments as a proportion of capacity can serve as an initial indicator of institutional relevancy and efficiency. All of these measures can, and ideally should, be assessed against costs, yielding a range of efficiency and cost-effectiveness indices.

5.02 Fundamental to all of these measures, of course, is the actual establishment of a training institution. From the perspective of World Bank project investments this is an implementation criterion, one bound by the initiation and completion dates of a given project.

ECONOMIC OUTCOMES

5.03 A review of Bank investments based primarily on document analysis is severely limited with respect to the indicators of investment effectiveness that can be used. Economic analyses of the outcomes of Bank investments are absent from project completion reports.

5.04 Reliable unit recurrent cost data is almost entirely lacking in project documentation. Recurrent costs were reported for 11 of the 76 projects in the sample (8 of 34 countries). The figures are most often developed by dividing gross recurrent cost budgets by enrollments across a set of institutions.

5.05 These data, however, generally confirm that vocational secondary schools are more costly on an annual unit recurrent cost basis than general secondary schools, with ratios ranging from 1.5:1 to as much as 11:1. Nonformal annual unit recurrent costs are about twice as high as in secondary vocational schools (Table 26).

5.06 In a very few instances collateral studies shed light on rates-of-return to investment. These show relatively high returns to nonformal training in Latin America (Kugler and Reyes, 1978; Jimenez, 1986). An analysis of returns to nonformal and secondary vocational training in Korea indicates somewhat higher returns to nonformal training (Lee, 1985); returns to both equal or exceed returns to general secondary education as measured four years earlier (see Psacharopoulos, 1987).

Table 26: Annual Unit Recurrent Costs
(US Dollars)

Country	VET Institutions: Institution/Mode	VET Institutions: Annual Unit Recurrent Costs 1/	General Secondary Institutions: Annual Unit Recurrent Costs 2/
Ivory Coast	Secondary Technical	1260 (1980)	885 (1980)
Korea	Secondary Technical	162 (1976) 659 (1979) 2039 (1980) 3/	186 (1980)
	Vocational Training Institute (NF)	1250 (1979)	
Malaysia	Secondary Technical	350 (1976)	146 (1976)
	Industrial Training Institute (NF)	800 (1984)	353 (1984)
Jordan	Secondary Polytechnic & Trades Training Center	1070 (1979)	90 (1980)
Brazil	Secondary Technical	1200 (1977)	206 (1980)
Equador	Secondary Technical	150 (1977)	113 (1977) 1/
El Salvador	Vocational Training Center (industrial streams)	159-378 (1975)	118 (1975)
Mexico	Secondary Technical	349 (1985)	69 (1985)

1/ Source: Staff Appraisal and Completion Reports.
2/ Source: UNESCO
3/ These costs were for a very sophisticated "model" technical school.

5.07 Data on placement, employer satisfaction and graduation rates are generally uneven. In the sixty-six completed components in the sample studied for this review, these data are available in usable frequency only for the Asia projects (see Table 27). The data tell us more about the difficulty of evaluating projects at completion than about outcomes. They also reflect the relatively stronger implementation capacity of the countries of Asia, at least in the sense that project institutions were more often completed in time for students to graduate and seek employment prior to project completion. However, while no cross-regional comparisons are possible, the data do show that, on the criteria of graduation rate, placement and employer satisfaction, the VET investments in Asia have had quite good outcomes.

5.08 These have included secondary vocational schools in Korea and secondary area vocational training centers in Indonesia, polytechnics in these two countries as well as in Malaysia, and nonformal training centers in Korea and Malaysia. Non-formal training centers in Indonesia have had a record of low quality and poor external efficiency, as has the polytechnic supported in the first Bangladesh project. In this region, at least, effectiveness has not been associated with a particular mode of training, but rather with expanding employment demand, good systems management capacity, and good training quality.

Table 27: Evidence on Outcomes, By Region, Completed Projects

	Graduation Rate (component average)		Placement Rate (% of all components)					Employer Satisfaction Rate (% of all components)				
Region	Rate	Percent of Components With Data	<50%	50-69%	70-89%	90%+	Percent of Components With Data	Poor	Fair	Good	Excellent	Percent of Components With Data
Africa	51	25	6	0	0	0	6	0	0	0	0	0
Asia	81	58	6	6	44	28	83	0	6	50	17	72
EMENA	100	05	0	0	10	05	14	0	0	05	0	05
LAC	74	20	0	0	10	20	30	0	0	0	0	0

IMPLEMENTATION OUTCOMES

5.09 While information on the criteria at the top of the hierarchy is scarce, we do have data on two related implementation standards. The first (Table 28) is the percentage of enrollment targets achieved at project completion. These figures, of course, do not capture the eventual enrollment performance of project institutions, many of which suffered from significant delays in project implementation. But they can be taken as indicators of the relative difficulty encountered in establishing training institutions in given modes in countries of different income levels.

Table 28: Percentages of Enrollment Targets Achieved at Completion By Mode and Income Level, Completed Industry VET Projects, 1963-82

	Mode				
Income Level	Secondary	Non-formal	Post-Secondary	VET Teacher Training	TOTAL
Low	.19	-0-	.64	1.05	.41
Lower-Mid	.93	.86	1.16	.88	.90
Upper-Mid	1.16	.99	.83	.43	1.09
Weighted Averages	1.08	.90	.91	.74	1.00

5.10 On this criterion, the implementation difficulties faced by low-income countries are clear. The data tend to confirm common knowledge regarding the relationship between overall economic strength and implementation capacity.[11/] They also provide some limited confirmation of the hypothesis that secondary vocational schools are on the whole easier to establish (or rehabilitate) than the more complex nonformal modes in countries at all income levels, and especially so in low income countries with the weakest implementation capacity.

11/ The relatively low ratio for teacher training in upper middle income countries is explained by very low ratios in two Algeria components.

5.11 These conclusions are supported by data on the second criterion, overall ratings of implementation performance for components in different modes. Tables 29 and 30 present the data by income level and by region.

Table 29: Average Component Performance*, 1963-82
By Mode and Income Level, Completed Projects

Income Level	Mode: Secondary	Nonformal	Post-Secondary	VET Teacher Training	OVERALL AVERAGES
Low	2.0	1.5	2.0	1.3	1.7
Low-Mid	2.2	2.2	2.2	2.5	2.2
Upper-Mid	2.6	2.7	2.3	2.5	2.5
(Without Algeria)	(2.8)	(3.0)	(2.8)	(4.0)	(2.9)
Weighted Averages	2.3	2.2	2.2	2.0	2.2
	(2.3)	(2.3)	(2.5)	(2.2)	(2.3)

*Scale: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent

Table 30: Average Component Performance*, 1963-82
By Mode and Region, Completed Projects

Region	Mode: Secondary	Nonformal	Post-Secondary	VET Teacher Training	OVERALL AVERAGES
Africa	1.7	1.8	2.0	1.3	1.6
Asia	2.9	2.5	2.6	3.0	2.7
EMENA	2.2	2.0	2.1	2.0	2.1
(Without Algeria)	(2.5)	(2.3)	(2.5)	(3.0)	(2.5)
LAC	3.0	2.5	2.0	0.0	2.8
Weighted Averages	2.3	2.2	2.2	2.0	2.2
	(2.3)	(2.3)	(2.5)	(2.2)	(2.3)

*Scale: 1 = Poor; 2 = Fair; 3 = Good; 4 = Excellent

5.12 The data indicate that, on implementation criteria, any mode of training can be established in middle income countries. Conversely, components supporting all modes have been less successful in low income countries. The direct relationship between level of income and component implementation performance as established by enrollment ratios is confirmed by these ratings, especially when the very low performance ratings for six Algeria components are removed. Overall, performance was rated the same for the four modes, with teacher training lagging and post-secondary leading slightly.

5.13 The data further confirm the comparative difficulty that has been encountered in establishing VET institutions in any mode in Africa.

5.14 Performance has varied only marginally over time. Comparison of the scores for two time periods (FY63-75 and FY76-82) reveals some improvement in low income and upper-middle income countries, and in EMENA. Declines of similar size occurred in lower-middle income countries and in the remaining three regions.

FACTORS IN SUCCESSFUL SYSTEMS EVOLUTION

5.15 Given these data on performance, one would expect to find case examples of effective VET systems among the middle income countries. In our review of VET investments in twenty-two middle income countries three stood out for the development of effective industrial training systems: Brazil, Jordan and Korea. These systems include formal secondary and post-secondary institutions as well as nonformal systems. The latter combine classroom instruction with formal apprenticeships, and are managed by SENAI (the National Service for Industrial Apprenticeship) in Brazil, the Vocational Training Corporation of Jordan, and the National Vocational Training Management Agency in Korea. In most simple terms, each system is built on a combination of formal vocational education and nonformal training.

5.16 In each of these countries the formal and nonformal training systems that evolved can be considered productive on a number of counts.[12/] Job placement after graduation is high. Internal efficiency, as measured by drop out, repetition and graduation rates is also high by comparison with other countries. Employers report satisfaction with graduates. Private and social rates of return to investments in nonformal training in Brazil range from 10% to 120% (Kugler and Reyes, 1978). In Korea, scores on national skills tests for graduates of three year vocational secondary school programs and of one year vocational training center programs are identical; estimates of social rates of return favor the vocational training institutes slightly, and are equal to or exceed social rates of return to general secondary education (paragraph 5.04). Employment rates are high, with the secondary schools providing a larger share of industrial workers than vocational training institutes (Lee, 1985).

5.17 Importantly, the systems have demonstrated considerable capacity to evolve to meet changing economic and social conditions. Evaluation reports, and interviews with professionals knowledgeable about these systems, describe them as effective and dynamic.

12/ There is little information about the equity effects of these systems in our review. Thus this crucially important issue will not be addressed here.

5.18 This is not to say that these systems have solved all problems, or are perfectly productive, but rather that they appear to be examples of "good practice" in developing countries. Thus they merit examination in terms of the common characteristics which appear to have contributed to current success. Nine of these emerge from our review.

(a) Long Time Perspective With Multiple Investments: In a extensive review of the literature, Dougherty (1988, forthcoming) notes the long maturation period required for effective training systems. In Jordan, this has taken 15 years with 5 project investments (and is still ongoing); in Korea it took 5 projects over 18 years; in Brazil 3 projects over 16 years.

During these periods investments were made in all modes, providing a broad context in which the system could evolve. Sector work contributed to the investment strategies. Importantly, sustained commitment to systems development over a long period permitted learning and adjustment in the process of developing institutional capacity.

(b) Expanding Industrial Employment: Although the circumstances varied, all three countries exhibited strong demand for skilled workers in the industrial sector during the period. While Korea and, most notably, Brazil suffered recessions, jobs for graduates continued to be available. In Jordan, first the exodus and then the return of skilled labor from foreign employment caused labor market imbalances to which both the training and employment systems had to adjust. Despite these difficulties, employment prospects for Trades Training Center (TTC) graduates remained strong.

Hence the training institutions in these countries could count on strong feedback from employers seeking workers, and increasingly strong and sophisticated employer participation in decisions on training curricula and enrollments.

(c) Small Formal Beginnings, Incremental Expansion: The first projects in these countries were relatively small and simple, and emphasized formal vocational education institutions. In Jordan, investments began with a combined polytechnic/trades training center, turned toward support of various secondary and post-secondary institutions, and took up the nonformal system in later projects. Korea began with extensions and rehabilitation for nine existing secondary vocational schools and four junior colleges. World Bank support for the development of the network of nonformal centers began six years later. Brazil began with secondary and post-secondary institutions, moving to support for SENAI five years later (although SENAI had been in existence for more than thirty years).

In all countries the formal systems have been relatively successful as well, and, as will be discussed below, became increasingly differentiated in function and governance from the nonformal system.

In the middle and later stages of systems development all three countries invested in larger numbers of institutions, more modes, and the development of policy and management capacity.

In sum, the record suggests that by beginning with relatively small investments in formal institutions, and gradually increasing the complexity of development in terms of the variety of modes. As policy, planning and management capacity developed, these countries were able to build incrementally from experience.

(d) Responsive Planning: In general, these systems were planned in response to -- not in anticipation of -- employment demand. In early stages, manpower data and manpower forecasting capacity were largely absent. Investments were justified on the basis of demonstrated industrial expansion. The development of strong institutional linkages between training and employment to facilitate incremental and localized planning and adjustment were, in retrospect, important alternatives to formalized manpower forecasting. In this context, the location of training institutions became an important variable. In Korea sites were chosen to be close to expanding enterprises; in Brazil, mobile training units were created to take training to the trainees.

(e) Early and Sustained Involvement of Enterprises: In all three countries sustained efforts were made to establish linkages between training and employment for all modes (in Brazil, these linkages had been part of the SENAI tradition since the 1940s). Enterprises played active roles in curriculum and enrollment decisions and in the design and provision of on-the-job training experience and apprenticeships. What may be most important is the consistency of commitment in training agencies to the importance of these linkages. Combined with expanding employment and increasingly effective enterprise management, this helped create a supportive "ethos" in which the needs of employers were taken seriously and reflected in training plans and curricula.

In later stages, the nonformal systems began to branch out to provide a range of training services to enterprises. In Jordan, this has taken the form of training centers established with the assistance of the Vocational Training Corporation in large enterprises, and in assisting groups of small enterprises to jointly sponsor apprentices for VTC training. In Korea and Brazil the nonformal training agencies have as a matter of policy sought to help enterprises develop their own training capacity.

(f) Evolution of Policy and Management Capacity to Match System Complexity: Each country began with relatively strong management capacity in Ministries of Education, but relatively undeveloped policy bases for VET. As the systems expanded, quasi-autonomous national nonformal training agencies were created to manage job training, with formal vocational education left with Ministries of Education. Policies in the form of legislation (Korea, Brazil) or development plans (Jordan) came in the middle stages of development, thus benefitting from accumulated experience.

National testing and certification systems received attention early in the investment program. These were important in providing feedback to policy makers and managers on the quality of training. In Korea they enabled the government to implement incentive schemes to attract good students to vocational tracks, most notably exemption from military service for graduates of vocational schools and training centers who scored above a criterion on the skill examination.

Finally, all systems were characterized by gradual decentralization of authority for curriculum decisions and revenue generation to training institutions. In Brazil, SENAI was decentralized to the State level. In Korea, the vocational training centers (VTCs) were planned to become quasi-autonomous public corporations, with governing boards that included employers, with a base of government funding and a mandate to raise and use additional revenues from the sale of training services. The extent to which this reform was implemented is as yet unclear.

(h) Increasing Attention to Alternative Financing Sources: In all countries sources of financing other than government appropriations from general tax revenues were developed as the systems evolved. In Brazil payroll taxes were introduced as a major source of financing for vocational training; both Korea and Brazil experimented with financial incentives to encourage enterprise provision of training. In Korea, in addition, student tuition was charged (accompanied by a scholarship program for disadvantaged students); user fees are also charged in Jordan. Jordan also uses earmarked municipal taxes to provide extra-budgetary support for both general and vocational education, with municipal control of allocations.

These innovations diversified and, in some measure, stabilized the resources available to the training system.

(i) Investment in Quality: The development of testing and certification systems, and of strong linkages between training and employment, contributed substantially to the ability of all modes to improve the quality and relevance of teaching and learning.

In addition, each country created incentives designed to attract and retain good quality instructors, most notably for the nonformal institutions. In Korea these included scholarships for teacher training with bonded periods of service, free housing and exemption from military service. Jordan provided scholarships (with bonded service) and salary incentives. In Brazil, scholarships were provided, along with salaries set to be competitive with private industry. While these measures did not entirely prevent loss of technical teachers to enterprises, they did enable each country to be comparatively successful in overcoming a barrier to quality endemic in other developing country contexts.

Similar incentives were offered to attract good students, another crucial input to the quality equation. In Korea "flagship" training institutions were created to add further status to blue collar work.

Although project documentation is silent on the point, systems in all three countries have benefitted from comparatively well developed general education systems. In all three countries universal primary enrollment has been achieved. The percentages of the age group in secondary education are 89% for Korea, 78% for Jordan and 45% for Brazil. Only in Brazil does the secondary enrollment ratio fall below the average for the country income group.

All three systems developed permanent curriculum development capacity that was integrated with teacher training and other support services. Occupational analysis was the basis for curriculum development and modification.

(i) Flexibility of Curriculum and Institutional Design: Taken together, these characteristics led to institutions that were, in comparison with those in many other countries, able to respond with considerable flexibility to changing economic circumstances. All three countries adjusted to strong social demand for training. Jordan allowed nonformal training centers to evolve towards secondary school status; Korea rapidly expanded enrollments despite overcrowding; and Brazil created mobile units to take training to dispersed populations.

Each also undertook major changes with respect to curricula. Korea converted two junior colleges into "open colleges", with unrestricted enrollment and flexible schedules, to serve in-service workers. Conscious efforts were made to adjust training curricula to changes in the technology of production, with significant employer participation. Jordan adjusted the system to deal with fluctuations in external labor markets, and established training centers in enterprises. In Brazil, curriculum development has been decentralized to the State level to improve

the fit with local needs, and considerable experimentation with the use of educational technology has been undertaken.

The capacity of the training system to make these adjustments has been a major factor distinguishing these three countries from many others. This capacity, of course, is crucial to institutional effectiveness in changing economies. It seems reasonable to think, moreover, that it has been achieved through the combined influence of the other eight characteristics.

5.19 It is important not to over-generalize from this kind of analysis. Nevertheless, it does illustrate how these developing countries have developed training systems which have the characteristics necessary to adjust to changing economies. Significantly, these systems involve a variety of training modes, including secondary vocational schools that are often comparatively successful.

5.20 We know very little, of course, about the economic effectiveness of the different kinds of training institutions in these systems, although the Korea data demonstrate at least the possibility of good external efficiency for secondary vocational schools, and there is stronger evidence for the external efficiency of nonformal training in several regions. Post-secondary institutions have been reported to have high placement rates for graduates (Malaysia, Korea, Jordan, Algeria). Teacher training institutions have been able to place graduates in teaching posts where salaries and conditions of work have been attractive.

5.21 Secondary vocational schools in middle income countries have been more effective than those in low income countries, particularly those in Africa. The explanation lies in the fact that many of the effective schools have acquired characteristics -- such as linkages with enterprises, incentives to attract and retain qualified instructors and students, good "feedback" systems -- which are most often thought characteristic of nonformal modes. They exhibit, in short, what Dougherty (1989) has identified in his review of the literature as the "convergence of modes." Thus they may no longer be "public vocational secondary schools" in the stereo-typical sense, but rather be evolving towards a new institutional form. Further investigation into this hypothesis, of course, is needed -- particularly to see the extent to which these institutions have been freed of the more constricting features of traditional secondary education.

Constraints on Effective Systems Evolution

5.22 In implementation terms, at least, investments in the development of national training systems in middle income countries have been successful. In contrast, less success has been found in the sample of components in low income countries, especially in Africa. These have been small investments, typically supporting a few vocational training institutions; most of these have been secondary vocational schools.

5.23 Implementation performance has been weak. Long delays in civil works and procurement prevented institutions from operating for a sufficient period prior to completion to permit assessments of educational outcomes (Gambia, Cameroon, Ivory Coast). Weak financing led to cancellation or the reduction in size of project institutions (Zaire, Ivory Coast, Gabon). High recurrent costs and constrained government budgets had significant negative impact on utilization and maintenance (Ivory Coast, Chad, Senegal, Guinea).

5.24 The nine characteristics of the more effective investment programs in middle income countries provide a useful framework for assessing these less successful projects.

(a) Long Time Perspective With Multiple Investments: With the exceptions of the Ethiopia, Ivory Coast, Cameroon, Senegal and Kenya, this perspective has been lacking. Single small projects, often unsupported by sector work and lacking investment in institutional capacity have not been effective.

(b) Expanding Industrial Employment: Small modern sectors, and stagnating employment markets, have characterized these countries. Larger investments have not been justifiable on the basis of employment demand. Weak economies face constrained investment choices, making longer-term programs difficult to rationalize, and existing institutions -- especially small and inefficient ones with high recurrent costs -- difficult to support. Where enterprises are small, and management weak, it has been difficult to generate effective participation by employers in training, and more difficult yet to establish training in enterprises.

(c) Small Formal Beginnings, Incremental Expansion: The beginnings were made in many countries, but expansion has followed in only a few. Investing first in the development of vocational secondary schools made sense in many countries. Overall administrative capacity was weak. Secondary schools were a known phenomenon, and could be managed by the Ministry of Education, which at least had some experienced in delivering education services. Lack of a longer-term perspective, weak employment demand and financial constraints, however, have prevented the training capacity of these countries from evolving further.

(d) Responsive Planning: This has not developed. Manpower requirements forecasts have been the basis for investment, but given economic stagnation have been largely inaccurate. Vocational schools administered by Ministries of Education have not acquired the flexibility necessary to adjust quickly to changing training demand. Constrained by long programs (three to five years), an obligation to deliver significant levels of general education, and inadequate recurrent financing, these institutions have not proven flexible. Although some nonformal centers made progress in this regard (Senegal), lack of sustained

investment in institutional capacity has weakened the ability of institutions to adjust quickly.

(e) Early and Sustained Involvement of Enterprises: All projects sought to create linkages between employers and training institutions. In the low income countries, however, linkages were fewer and more difficult to establish. For the secondary schools, in particular, linkage development was problematic. And in many countries there was no follow-on investment to provide sustaining support for linkage creation.

(f) Evolution of Policy and Management Capacity: This has occurred in Ethiopia, and may be underway in Cameroon, Ivory Coast, Kenya and Senegal. However, in general, management and policy development has been weak.

(g) Increasing Attention to Alternative Financing Sources: Again, this may be developing in the countries that have continued to invest in their training systems. Efforts to establish payroll tax levies have been delayed by lack of a longer-term perspective and political differences as to whether training ought to be made separate from the formal education system.

(h) Investment in Quality: Investment in institutional capacity for quality improvement has tended to be weak. Curriculum development capacity has not been established; testing and certification systems are largely lacking. Salaries and incentives needed to attract and retain indigenous teachers have not been put in place, with consequent continuing reliance on expatriates despite significant efforts in teacher training. Demand for places in vocational institutions has been uneven, as students and parents perceive greater opportunities through higher education, raising problems of student quality and motivation.

(i) Flexibility of Curriculum and Institutional Design: The net effect of the economic context for these investments, the lack of long-term perspective and institution-building, and low levels of investment in quality has been, in many countries, vocational training institutions that have lacked the flexibility necessary to adapt to changing economic circumstances. Many of these institutions are inefficient, with high costs and low utilization rates. While economic evidence on external efficiency is weak, the available information suggests that it is most often low.

5.25. This is a gloomy assessment. And indeed these problems have apparently been recognized by the Bank, and many governments. Within the sample, only one investment of this type has been made in Africa after FY79 (Burundi II, FY80). Of the projects in the eight countries beyond the sample with VET investments since 1980, six invested only in nonformal

training.[13/] One invested both in nonformal and post- secondary training (Sudan III). Only one investment in secondary vocational schools was made (Rwanda III); that project also includes a nonformal component. These are mostly small components: only three exceed US $5 million.

5.26 Since this watershed in time, investments in vocational secondary schools have given way to nonformal modes. The components remain small, however.

5.27 Three of the five components in the sample address financing constraints (Senegal, Cameroon, Ivory Coast). All of these were preceded by sector analysis.

5.28 Hence there is evidence that some of these countries may be moving along the general line of development that has been followed in middle income countries. However, the continuing economic crisis in the region will be a factor, both in employment demand and in financial support for training. It is not clear that the crucial policy issues -- clear separation of vocational training from vocational education, responsive planning and institutional quality, enterprise linkages, stable financing for nonformal training -- are being successfully addressed.

5.29 Nevertheless, these investments provide some encouragement for a limited number of countries. Remaining is a crucial investment question. How can the training needs of small countries, with limited modern sector employment demand, increasing recognition of the importance of informal sector employment, and severe financial constraints establish cost-effective skills training capacity? This question will be addressed, though not completely answered, in the next and final chapter.

SUMMARY

5.30 The performance of vocational education and training should ideally be evaluated against the ultimate objective of economic efficiency. Economic evaluation of Bank investments, however, is limited by the lack of indicators of investment effectiveness in Bank project completion reports. These reports are often written just as disbursements are completed, before any outcomes can be reported. Data on placement, employer satisfaction and graduation rates are available only to a significant degree in the Asia region; these indicate the success of these projects.

5.31 Another basic objective against which these investments may be evaluated is the successful establishment of a training institution as measured by two implementation criteria. The first criterion is the percent of projects meeting their target enrollments by project completion; the second is the overall ratings of implementation performance for components. The data indicate that any mode of training can be established in middle

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13/ Botswana, Lesotho, Burkina Fasso, Guinea, Liberia, and Mauritania.

income countries; conversely, components supporting all modes have been less successful in low income countries.

5.32 Succesful VET systems in middle income countries have in common nine characteristics:

(a) A long-term investment program spanning several projects;

(b) Expanding industrial employment;

(c) Initially small projects, followed by increasingly complex investments that support a variety of modes supported and build management and policy bases;

(d) Planning that responds to, rather than anticipates, employment demand;

(e) Early and sustained involvement of enterprises;

(f) Evolution of policy and management capacity to support increasing system complexity;

(g) Increasing attention to developing alternative financing sources;

(h) A focus on quality development through introduction of testing and certification systems, strong linkages between training and employment, and curriculum development capacity integrated with teacher training, all designed to improve the quality and relevance of teaching and learning, as well as incentives designed to attract good quality instructors and students.

(i) As a result of all these factors, training institutions able to respond flexibly to changing economic circumstances.

5.33 A further characteristic of successful systems evolution may be the "convergence of modes" as vocational secondary schools take on some of the characteristics of nonformal institutions, such as linkages with enterprises, incentives to attract and retain qualified instructors and students, and responsive planning.

5.34 In contrast, the implementation of components in low income countries, particularly in Africa, has been less successful. Characteristics common to these less successful projects include:

(a) A focus on single small projects, often unsupported by adequate sector work and lacking investment in institutional capacity;

(b) A small modern sector and stagnating employment market;

(c) Limited expansion of training capacity due to weak employment demand, financial constraints and weak implementation capacity;
(d) Planning based largely on inaccurate manpower forecasts;

(e) Fewer linkages with enterprises;

(f) Weak management and policy development;

(g) Less success in developing alternative financing sources;

(h) Little investment in quality improvement;

(i) In consequence, institutions that are relatively inflexible in the face of changing economic circumstances.

5.35 There is evidence that some of the low income countries may now be moving along the general line of development that has been followed in middle income countries. However, further development may be constrained by the continuing economic crisis, which will negatively affect both employment demand and financial support for training.

VI. Lessons for Future Investment

6.01 The principal lesson to be drawn from the analysis is that economic circumstances have great impact on the success of VET investments. It follows that the investment designs and institutional models employed in lending should vary with economic circumstances. In middle income countries, continuing support to enhance the quality and efficiency of the national training systems established over the past decade will be required. In the small, poor countries of Sub-Saharan Africa simpler models, based on nonformal delivery modes, should have priority. In this latter circumstance, sustained investment over time in institutional capacity, perhaps supported by sub-regional professional institutions, will be required. The record suggests that the Bank has an opportunity to improve the quality of lending for VET significantly, if sufficient policy and operational support can be provided.

INTRODUCTION

6.02 Although based on a large and representative sample of VET components, the foregoing analysis has a number of limitations. The analysis of broad lending trends is comprehensive, and its conclusions regarding shifts in emphasis within VET towards nonformal training modes and training for industry, and away from secondary vocational schools and training for agriculture, can be taken as conclusive.

6.03 The analyses based on the sample of components can be accepted as valid for the general patterns identified. However, some detail is inevitably lost in sampling. The components not chosen may contain significant innovations, or be otherwise of interest.

6.04 Finally, the large sample compensates to some extent for uneven treatment of investments in Staff Appraisal and Project Completion Reports. Nevertheless, the data are limited in many respects, notably in regard to the educational and economic outcomes of training.

6.05 Despite these caveats, lessons can be drawn that suggest directions for future investment in vocational education and training. Clearly, these cannot be taken as rigid prescriptions for investment design. Adjustments, sometimes significant ones, will inevitably be required in individual country circumstances.

6.06 The lessons, moreover, relate primarily to the design of VET systems and investments; the scope and data of the study permit only the most rudimentary conclusions regarding the economic justification of investment. Thus the lessons assume prior economic justification, though

they do raise issues regarding the nature of such justifications under different economic conditions.

6.07 This concluding discussion of the implications of the review for future investments is structured in four parts. First, the impact of the economic context of VET investments is summarized. This provides background for an analysis of the comparative effectiveness of alternative training modes that follows. The third section addresses the implications of the review for investment design in different economic contexts. A final section identifies implications for World Bank operations.

THE ECONOMIC CONTEXT OF VET INVESTMENTS

6.08 Among the clearest findings from World Bank experience in vocationally-specific education and training is the differential pattern of evolution, and of effectiveness, of VET in economies at different levels of development. Quasi-autonomous national training systems, sharply differentiated from formal vocational education, have been developed with comparative success in middle income countries. These include sector-specific "free-standing training" systems. This lesson has been learned and applied in the design of Bank-assisted investment programs in these countries.

6.09 The general characteristics of this model have been discussed in some detail (paragraphs 5.16). The key elements are quasi-autonomous training agencies, decentralization, responsive planning, nonformal delivery, strong linkages to enterprises, permanent curriculum development and staff training capacity, the ability to offer attractive incentives to teachers, testing and certification capacity, and alternatives to government financing that involve, in one way or another, contributions from enterprises. Many of these training systems are paralleled by effective post-secondary institutions for technician education and training, also strongly linked with industry. This complex institutional model demands strong management, and has required sustained investment in institutional capacity.

6.10 In contrast, VET systems have been much more difficult to establish in low-income countries, especially those in Sub-Saharan Africa. It has been possible to establish all modes of training in middle income countries; and equally difficult to do so for any mode in the poorer nations. In a relatively few countries in Sub-Saharan Africa Bank-assisted investments are seeking to develop training systems generally along the lines suggested by experience in middle- income countries. The success of these investments is not yet known; the probability of effectiveness is clouded by economic constraints. The more widespread turn towards the establishment of nonformal training centers in Sub-Saharan Africa is encouraging given the demonstrated greater potential of such institutions to respond flexibly to changing demands. But it is not clear that these investments benefit from the sectoral analysis that appears essential to the development of strong policy frameworks and investment programs. Given the

weak implementation performance of past nonformal components, encouragement must be tempered with concern for implementation issues, notably the development of planning and management capacity.

6.11 The reasons for the differences across levels of economy are straightforward, and fall on both the demand and supply sides of skill development. In stronger economies, demand for skilled workers and technicians leads to stronger enterprise participation in the training effort. Direct and indirect enterprise financing is more possible. Enterprise managers are more willing and more able to provide the information necessary for flexible and efficient training, and to cooperate with training institutions in the development of a range of productivity enhancement services, including enterprise training capacity. The relatively large size of employment demand increases job opportunities and hence the external efficiency of VET institutions. This is further increased as training institutions devote a greater share of their resources to in-service training. The positive feedback of success further enhances the confidence of employers in training, and of training institutions in developing flexible, demand-driven training services.

6.12 The effectiveness of vocational training in stronger economies is also supported by stronger systems of general education. Trainability is higher. The perceived need to combine general and vocational education is consequently less, and secondary diversified and vocational schools consequently less attractive.

6.13 Stronger economies have stronger project implementation and systems development capacity. This appears to be unusually important to the development of VET systems, more so perhaps than for general education. Establishing a flexible and responsive vocational training system is a most complex institutional development task. Unlike general education, where what to teach and to whom can be taken for granted for relatively long periods of time, effective vocational training requires constant adjustment to meet the changing needs of industry. This characteristic is of crucial importance under conditions of economic instability, whether caused by rapid growth or by economic stagnation. Planning, management and coordination requirements are consequently very high. And the demands on management for efficient mobilization and use of costly resources (higher-priced instructors, expensive equipment and facilities) are equally great.

THE EFFECTIVENESS OF ALTERNATIVE TRAINING MODES

6.14 Experience indicates that, in middle income countries, investments in nonformal training institutions, especially when part of national systems, have been effective, as have investments in post- secondary institutions. Secondary vocational schools in these countries have worked well when linked closely to enterprises, and when salaries and incentives have been sufficient to attract qualified instructors. Teacher training investments have also performed well where

such incentives were in place. In contrast, it has been difficult to establish any mode of training in low income countries.

6.15 Strong employment demand, relatively well developed enterprises and good implementation capacity are conditions for effectiveness. The complex nature of vocational education and training delivery, and design differences of alternative modes, however, also play a part.

6.16 VET differs significantly from general education. In general education, efficiency can be achieved through stability, marked only by the continuous need to improve quality, and the long slow swing of educational reform. This leads inevitably to the "education perspective," with hierarchical advancement of students through rigid, time-bound curricula towards the highest level of education they can attain, and that they or their country can afford. Goals are taken from society at large, and the perspective of planners and managers is generally inward toward their system.

6.17 Cost-effective VET requires a "training perspective," in which goals are derived from the shifting realities of the economy and labor markets. The perspective must be towards the external environment. Efficiency comes not through stability, but through continuous change. Effectiveness increases as institutions gain the capability to provide a range of training and productivity services: in- service training, consulting, the development of enterprise training capacity.

Secondary Vocational Schools

6.18 Many of the difficulties encountered in establishing effective vocational secondary schools in low income countries flow directly from the failure to establish a "training" model in an education setting, under conditions of generally weak implementation capacity, small enterprises with weak management, and relatively small modern sector employment markets.

6.19 In stronger economies, secondary vocational schools can acquire enough of the training perspective to operate more or less flexibly. Linkages with employers can be established, resources made available to attract qualified instructors, and the management strength flexibility requires can be put in place. These institutions are better able, for example, to provide evening in-service courses for workers. When effective, these schools thus appear to have acquired many of the characteristics of nonformal centers while retaining a general education function. In this respect, they may to some extent resemble the highly evolved and effective area vocational centers in the United States, which combine pre-service training for youth, in- service upgrading and re-training for adult workers, and productivity services to local enterprises.

6.20 But it is not clear that such schools are the most cost- effective way to meet skill training needs in developing countries. More focused and less costly training after secondary school, or as an alternative, would appear to be a better model in many cases. This issue is only partly

addressed when the responsibility for vocational education and for vocational training are clearly differentiated. Additional thinking about the most appropriate role for secondary education vis a vis employment is urgently needed. Costly diversified high schools have largely been abandoned as a strategy because labor market outcomes have generally not justified the increased cost. At the same time, lower cost secondary curricula that do a better job of preparing students for further training are needed.

Nonformal Training Centers

6.21 Nonformal training centers are designed for a training perspective. The evidence clearly indicates that these have been intended to address a broader range of objectives, with relatively high emphasis on upgrading worker skills. They have been more effective in establishing linkages with employers, especially in the areas of financing and labor market information. In the sample, only nonformal institutions developed training services for enterprises. By design, these are inherently better able to offer short courses based on occupational analysis, and to use part-time instructors from industry. If well managed, they have the demonstrated capacity for flexible response to changing labor markets.

6.22 Such centers have been established in middle income countries. In the low income countries, the evidence on enrollment attainment at completion and on component institutional performance indicates that they have been beset with the same implementation problems as vocational secondary schools. Indeed, the evidence suggests that secondary schools are somewhat easier to put in place than nonformal centers in such circumstances. This is seen in less variation in unit costs per place established across regions, and in slightly higher performance on implementation indicators. In low income countries, the potential for greater effectiveness of nonformal training has, so far, been confounded by the management challenges of a new and more complex institutional design. The relative cost-effectiveness of vocational secondary schools and nonformal training institutions in middle income countries in pre-employment training cannot be judged from World Bank project experience. The available data from Korea demonstrates that these modes can be equally cost-effective, but the Korean context is unique in the strength of the basic education system and the rapid growth of the industrial sector.

6.23 The costs of establishing nonformal training places have been about twice those of secondary places in low income countries. In lower-middle income countries secondary places have cost somewhat more. In upper-middle income countries nonformal places have cost nearly seven times those in secondary vocational schools. Nonformal places, of course, are used more frequently in a given time period than those in secondary schools. While data on the outputs of these systems is uneven, the cost ratios alone suggest that output costs for nonformal centers should be lower in lower-middle income countries, and possibly so in low income countries -- assuming that institutions of both type operate at capacity.

Post-secondary Institutions

6.24 Post-secondary institutions have received greater emphasis in middle income countries, where demand for technicians is presumably higher. The implementation performance of these components has been the best, overall, among the four modes studied (excluding Algeria projects). Enrollment performance has been good, and where data are available employment prospects have been good as well. Importantly, these institutions have been well-linked with enterprises, with even more use of on-the-job training and instructors from industry than nonformal institutions. The relatively standard design of these institutions, and the fact that many have been located on the campuses of existing universities, have no doubt contributed to implementation effectiveness. The unit investment costs per place have been generally high in comparison with secondary and nonformal components, and have increased with the income level of the country, reflecting high construction and equipment costs.

Vocational Teacher Training

6.25 Teacher training components have performed relatively well. Enrollment performance has been respectable, and very good in Africa. Implementation ratings are above average in middle income countries, though below average in low income countries. Among the completed components, those in Indonesia and Korea were particularly effective. Unit investment costs in Asia, EMENA and LAC, while high, were comparable to costs for post-secondary institutions or, in the case of LAC, nonformal institutions. The unit investment costs in Africa, however, were very high, in part due to the small size of institutions.

6.26 Investment in teacher training components has been relatively low in the past, with recent increases -- notably in Sub-Saharan Africa. This has been compensated for, to some extent, by widespread incorporation of in-service training, fellowship training, and expatriate teachers. The strategies have generally been adequate outside of Africa.

6.27 Key to effective staffing have been salaries and incentives that attract qualified individuals to vocational teaching and training. Where these are not in place, training efforts alone have been inadequate to the task.

IMPLICATIONS FOR INVESTMENT DESIGN

6.28 The review suggests three broad contexts for future investment in VET. One is comprised of middle income countries where national training systems have been established. A second is middle income countries and a few large low income countries where this is yet to be achieved. The third is comprised of low income countries, especially those in Sub-Saharan Africa, where effective vocational education and training have yet to be firmly established.

6.29 In all contexts, Dougherty's conclusion that the challenge is to improve and adjust existing systems, rather than to start over with some new model, should be borne in mind (1989, forthcoming). Adjustments will come through policy and institutional change, and these should continue to be clearly addressed in Bank operations.

Middle Income Countries: Established Systems

6.30 Those countries with established institutional frameworks confront five inter-related tasks: a) rehabilitation and re-equipping of older training institutions; b) continuing efforts to improve training quality; c) improving efficiency; d) reducing reliance on government financing subsidies; and e) adapting successfully to new training roles as the nature of technology in industry changes and as employment expansion strategies focus on small enterprises and informal sector employment.

6.31 Rehabilitation: The trend in recent investments has been towards rehabilitation and new equipment for existing training institutions, and technical assistance support of institutional development. This trend is likely to continue, with relatively little new construction. Because national systems are in varying stages of completion, and because of expanding populations, some additional new construction will be required. Continuing growth in the industrial sector may expand the need for technician education, with consequent need for investment in new or expanded post-secondary institutions.

6.32 Improving Quality: In many countries the elements necessary for continuing quality improvement are in place for both national training systems and polytechnics: institutionalized testing and curriculum development; staff training capacity, and the ability to pay attractive wages to instructors; strong basic education systems. These elements must be maintained and strengthened. Where they are not yet developed, investments should be made.

6.33 It is important to note that it is the combination of these factors that leads to quality. Investments should thus seek to support balanced and integrated development of these capacities.

6.34 Testing and certification systems are central to monitoring the performance of training, and contribute substantially to labor mobility. Measures of performance are essential to management effectiveness as well as to policy changes. The capacity for test development and administration, as well as re-development as occupational requirements change, is a key element in both internal and external efficiency of training.

6.35 The development of training curricula from occupation and job analysis is characteristic of many effective systems, especially the nonformal components. This is the standard approach in most of the developed world. It provides a strong basis for collaboration between employers and training institutions and can contribute to efficiency by focusing training on essential knowledge and skills, thus reducing training

time. It also provides a framework for continuing modification of curricula and occupational testing as jobs change.

6.36 Adequate and qualified instructional staff are also crucial to training quality and effectiveness. It is quite clear that adequate salaries and incentives must accompany teacher and instructor training. This will inevitably raise the cost of vocational training in comparison with general education absent compensating mechanisms.

6.37 One of these is the use of part-time instructors recruited from industry. This has been shown to lower costs in Uruguay and Mexico. This strategy obviously depends on the presence of sufficient numbers of such persons in the locality of the training institution; this is one of several factors (including in addition the development of linkages between training and enterprises) that make the location of training institutions important in planning. The Mexican experience further demonstrates that heavy reliance on part-time staffing requires considerable flexibility in course scheduling, as well as continuing recruitment and training. Nonformal training institutions, in areas of relatively high industrial density, are most likely to be able to rely on this strategy. In larger countries, this further supports decentralization of staffing decisions and training capacity.

6.38 Curricula based on occupational analysis, by reducing training time, can also reduce staffing requirements.

6.39 Yet to be explored is the potential of various instructional technologies to offset trainer costs. The capability of a variety of technologies (video disk, micro-computers, video cassettes) to handle defined instructional tasks has been demonstrated in developed countries. The implementation and cost parameters as they apply in developed countries, however, are yet to be determined systematically.

6.40 Student quality is a crucial input to good training. General education in many middle income countries can provide an adequate pool of qualified applicants. Where this is not the case, careful consideration must be given to the size and design of training systems. Under-utilized capacity, in either a physical or instructional sense, should be avoided.

6.41 The evidence suggests that incentive programs can increase the quality of students. These need not always be financial as the Korean experience demonstrates. Marketing of VET through demand generation activities merits further exploration. Labor market realities, however, will undoubtedly continue to dominate the perceptions and expectations of parents and students with respect to pre-employment training. If there are few jobs, or if wages are not attractive, VET below the post-secondary level will continue to be seen as a second-best option, with limited career prospects.

6.42 Improving Efficiency: The high costs of VET must be of great concern, even where resources for education and training are relatively abundant. Strategies for cost containment, coupled with increasing quality, are crucial to improved cost-effectiveness.

6.43 The evidence suggests that nonformal institutions, with inherently greater institutional flexibility, are better positioned to take advantage of the cost-containment potential of occupation-based curricula and part-time teachers. Flexible scheduling can also increase the utilization rate of facilities.

6.44 The combination of classroom and workshop training with supervised on-the-job training through apprenticeships in industry, in addition to improving training quality, has the further potential advantage of reducing in-center training time and equipment costs. This model has been implemented, in varying degrees, for both nonformal centers and polytechnics. This "dual system" rests on very strong linkages between training and enterprises. It further requires development of enterprise capacity to manage their part of the curriculum, and in-plant supervision from the training institution. The management and coordination requirements are high. When coupled with decentralization, these factors alone argue for significant investment in institutional capacity both in training institutions and in enterprises.

6.45 Investment in the human resources management capacities of the enterprises served by training has not been part of education sector lending. In the last analysis, strong management is central to efficiency gains. One of the apparent virtues of vocational secondary schools not linked to enterprises is much lower requirements for institutional management. The weaknesses of pre-employment training not linked to shorter-term employment prospects, however, are great. As national systems have turned increasingly to nonformal training, the need for the development of training management capacity has grown. The analysis indicates that the Bank and governments have responded to this need. It is not clear, however, that these investments have given adequate attention to the human resources management capacity of enterprises. This is an area where new investment strategies may be needed.

6.46 Finally, external efficiency depends heavily on the match between the supply of and demand for skills. Global manpower forecasting has not been an effective planning approach in unstable economic conditions, whether caused by rapid growth or stagnation. Decentralized planning in response to shorter-term labor market trends holds considerable promise. In this respect, the success of nonformal and post-secondary institutions in establishing linkages with employers is encouraging. This will require investment in planning and management capacity at different levels of the system. Crucial in this respect will be increased capacity to monitor the labor market outcomes of training through tracer studies, and enterprise and labor market surveys.

6.47 Alternative Financing: The Bank's experience is, of course, restricted to investment in training systems in which the government is a financial partner. With the exception of the subsidized loan program for private vocational schools in Korea (paragraph 3.85), all the institutions financed were, to some degree or another, directly subsidized by governments. Thus the possibilities inherent in privately owned non-profit or profit-making training institutions fall outside the scope of this review.

6.48 In fact, government financing in the establishment of vocational education and training institutions has been the norm in developing countries. The rationale for public financing, when explicitly addressed, has generally been couched in terms similar to those of investments in infant industries. Skilled manpower is necessary for economic growth; public investment in establishing VET capacity is therefore justifiable on the grounds of externalities beyond productivity and earnings gains. Much VET, of course, has been directed towards public sector employment. And in any case, neither fledgling enterprises nor poor clients have had the means to finance training.

6.49 Some vocational and diversified secondary school investments, though justified primarily on anticipated employment outcomes, may in fact have been rather more intended to have broader social benefits (i.e., broader awareness of technology in society), and thus could be thought to have merited public financing on the same basis of general education.

6.50 While direct public subsidy has been justifiable in early stages of systems development, even in middle income countries, increasing attention has been given to alternacive financing arrangements. The impetus for such arrangements comes from two sources. The first is economic. To the extent possible, socially efficient investment requires that those who benefit pay for services received. Vocational training and education ostensibly intended to increase employability and productivity benefit the worker and the firm most directly. High private rates of return to training substantiate the theoretical basis for this principle.

6.51 The second is institutional. The sustained effort required to develop complex VET systems depends heavily on stable financial resources. Uncertain government budgets constrain longer-range institutional development, and can have devastating effect on recurrent cost budgets -- and thus institutional effectiveness.

6.52 The principal alternative to direct public financing of training has been the fixed payroll levy to finance nonformal training. Ubiquitous in Latin America, this model of financing has spread to EMENA, and to a lesser extent Africa and Asia.

6.53 When implemented, payroll taxes have had the virtue of providing stable financing for systems development. Indeed, in some countries (Brazil, Colombia) the size of the financial resources mobilized has led to concerns that training may be over-funded to the neglect of other social

services (Ducci, 1987). There is, however, reason to question the general assumption that such taxes represent employer financing for training. Research on payroll levies in general indicates that these are most often passed on to the worker in the form of reduced wages, or to the consumer in terms of higher prices (Whalley and Ziderman, 1989).

6.54 Direct financing by the beneficiaries of training comes most clearly through student tuitions and fees, and through direct purchase of training services by enterprises. Within the sample, student fees provided significant revenues only in Uruguay; contract training is intended to cover 25% of recurrent costs in Senegal. Other means of financing (sale of products, in-kind contributions from industry) have not been significant when measured against the overall costs of systems.

6.55 The issues of financing are complex, and largely exceed the scope of this paper. However, experience suggests that payroll taxes provide at the least a stable source of financing for systems development. Contract services appear to have potential where well developed training systems are capable of providing good quality services, and where enterprise managers are willing to invest in their purchase. Student fees, even in middle income countries, are unlikely to provide significant revenues; these will be even less if the costs of scholarships intended to increase equity of access are taken into account.

6.56 The logical extension of the economic theory of equitable financing would be direct financing and provision of training by enterprises. This approach has been tried in Brazil and Korea. In Brazil, enterprises were given the right to deduct twice the amount of expenditure on vocational training from pre-tax profits, up to a fixed limit. The volume of enterprise-based training increased significantly, but the increase was concentrated in the larger enterprises and the best developed regions, with negative equity effects (Ducci, 1987).14/

6.57 In Korea, a complex incentive policy was put into effect in the mid-1970s. Firms were required by law to provide in-service training for a proportion of their work force as determined through a formula which took into account overall manpower needs, employment vacancies, the level of employment in the occupation and anticipated economic growth. Firms had the choice of conducting this training, with government review of training plans and budgets, or paying a tax for each worker not trained equivalent to the average training costs in the industrial sector in the preceding year.

6.58 In practice, the system had differential results. Large firms with high skill requirements provided adequate training. Large firms with low skill requirements complied with the requirement superficially to avoid

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14/ In Chile, the national training system was privatized in the mid-1970s. All revenue had to come from sale of services to enterprises, which were granted tax deductions. The results were similar to those in Brazil (Ducci, 1987).

paying taxes. Small and medium sized firms, with high labor turnover, simply paid the tax (Kim, 1987).

6.59 Future investments in middle income country VET systems should address issues of financing. Payroll tax financing may be an important long-term transitional arrangement, ensuring adequate financing for systems development. Evidence suggests that evolution towards incentives to stimulate enterprise provision of training must be done cautiously, with attention to likely equity effects.

6.60 New Training Roles: The general trend as national training systems have developed has been towards provision of a wider range of training services to employers. In-service training for workers usually comes first, followed by development of enterprise training capability, and management and productivity consulting services. All of this has the effect of bringing training closer to enterprises. Investment should continue to support this evolution.

6.61 Two additional roles should be considered in further investment. Explicit policies of technological development are becoming important in expanding middle income countries, such as Korea, Jordan, Brazil and Turkey. Strong national training systems, already providing a range of support services to industry, may often be well positioned to assist in the process of technology dissemination and installation. New production technologies require, in addition to new skills in the work force, new production management techniques (such as statistical quality control) and in some cases marketing assistance for products. While technology research and development is most likely to reside in universities, specialized institutions and, in some cases in polytechnics, technology extension services could well fall within the ambit of VET systems. These services could be especially valuable for small and medium-sized enterprises.

6.62 The second is in providing training and other support services for informal sector employment. The Bank has relatively little experience in this endeavor. And it is not entirely clear that large national systems are best suited for this role. However, the issue is being addressed in some Latin American countries (Ducci, 1987). While this role may not be integrated into the services provided by national systems, it should be addressed in broader analysis and planning for training development.

Middle Income Countries In Earlier Stages of Development

6.63 Experience suggests that these countries, as well as larger low income countries (such as India and Pakistan), can use the experiences of countries further along in the development of VET systems as a guide to investment.

6.64 Given the complexity of the task, and the importance of employment demand, strong enterprise management and good implementation capacity, careful sector analysis will be essential to effective investment. These analyses should give close attention to the nature of effective employment

demand. More reliance should be placed on labor market surveys, vacancy and unemployment rates, and other indicators of short term demand, rather than on global manpower forecasting. The development of labor market monitoring mechanisms should be of high priority.

6.65 Management capacity is of crucial importance, and should receive considerable emphasis in sector analysis. This should extend beyond management in the VET system to include enterprise management capacity. The latter is crucially important to linkage development and, over the longer term, to enterprise provision of training. Decentralization policies in larger countries must be based on through assessment of the needs for management development at lower levels of the system.

6.66 In addressing system quality, emphasis should be given to the balanced development of key elements -- testing, curricula, staffing, and students. Sector analysis should address the extent to which these elements are in place, and are functioning well together.

6.67 On the policy level, a major issue is the structural separation of vocational training from vocational education. Implementation of this policy has encountered resistance from the education sector in the past, and is likely to continue to do so. Important to the resolution of the issue will be a reconsideration of the proper role of secondary education vis a vis employment. While it is the case the secondary vocational schools can be effective when they acquire characteristics of nonformal training, it is not clear that this is a cost-effective way to meet training needs. As noted, new thinking on the best contribution of secondary education to employment is needed. Ministries of Education may be positive about relinquishing vocational education if the general role of secondary education in preparation for work can be strengthened at low cost.

6.68 A second important policy issue is financing. Experience demonstrates the value of payroll tax levies in providing a stable source of financing for systems development. While not representing enterprise financing for training, such systems at least link financing for training with the sector it supports. An additional benefit can be stronger linkages between training and employment.

6.69 However, experience demonstrates that enterprise opposition, especially under difficult economic circumstances, can delay if not defeat implementation of this policy. Other social services may well advance legitimate claims on resource flows. Payroll taxes, in short, should not be recommended without careful analysis of these factors.

6.70 Direct enterprise financing through contracts for services is a desirable model. While it is unlikely to cover all costs in most cases, it can assume a significant share of the revenue burden. It also provides a clear and direct link between demand and supply. Again, the success in developing contract training requires good management on both sides, as well as financial regulations which permit government financed institutions to retain and use earned income.

6.71 Student fees can be a third important source of finance. Again, analysis of the ability to pay, and of equity effects, is needed as the basis for policy reform.

6.72 Finally, the record suggests that a decade or more is needed to establish these systems in middle income countries. Depending on the state of the system, an investment program -- rather than a single project -- may be required. Given the very high policy and institutional development content likely in these investments (as opposed to civil works), sector lending may be appropriate.

Low Income Countries

6.73 Most of these are small countries in Sub-Saharan Africa. Many have begun to invest in nonformal training; a relative few are clearly embarked on the development of a policy and institutional framework for training. In almost all countries the conditions for effective systems development are weak. Modern sector employment demand is low, enterprises management is less developed, and implementation capacity has been weak.

6.74 The early investment emphasis on vocational secondary schools can be seen as responding in part to all three conditions. Cautious expansion of vocational training within general education offered a lower-cost strategy to meet small absolute demand for skills, even under optimistic assumptions for economic growth. Moreover, it would help meet high social demand for secondary education. With few strong enterprises with which to establish linkages (or in which to establish training), creating general training capacity to increase the stock of skills available to weak labor markets, based on global manpower forecasts, could have been a reasonable approach. Secondary schools were relatively simple and known institutions, and Ministries of Education were in place to run them; Ministries of Labor were frequently less well-establisheded. Free standing, nonformal training systems, in contrast, presented a much more complex institutional model. Small absolute manpower demand indicated small institutions, with high unit costs.

6.75 In the event, growth did not materialize; labor market demand stagnated. Enterprises did not develop as hoped. Under conditions of economic stagnation, the high costs of vocational education and training and constrained government budgets led, in some cases, to underutilized facilities. Inputs necessary for quality were delayed or reduced. Implementation capacity did not develop strongly, as evidenced by project performance and the continuing reliance on expatriates. The latter is also in part due to difficulties encountered in providing adequate salaries for skilled instructors. These problems affected both the secondary vocational schools and the nonformal centers.

6.76 It has been observed that strong general education is the best preparation for work. Advocates of this position suggest that vocational training should be left to enterprises and, through private schools and

centers, to the initiative and finances of the individual. This is an appealing concept from the perspective of economic theory. And it may be found in operation in Japan, if not in any other developed nation. But it has little current relevance in the small poor countries, with imperfect labor market information, weak enterprises and capital markets, and poor people. In practical terms, the state must continue to invest in the development of training capacity. All successful systems development in middle income countries began with heavy government investment and continues to be subsidized.

6.77 Thus government investment must continue if manpower needs are to be met. At the same time, a new approach to vocational training is clearly needed under these circumstances. Equally clearly, it must be based on careful sectoral analysis that addresses the essential conditions for effectiveness.

6.78 The need for a new model is addressed in three parts below. First, directions for future investment design are identified and discussed. Second, the issue of the vocational secondary school is treated separately. Finally, the potential contributions of sub- regional cooperation are assessed.

Directions for Investment Design in Low Income Countries

6.79 It is not clear how quickly these countries can follow the path of development that has led to effectiveness in middle income countries. In the short-term, at least, the conditions for effective system development along that line are unlikely to improve substantially.

6.80 However, possible directions for investment design are suggested by the analysis.

(a) Focus Investment on Nonformal Training

Responsibility for administration should be separated from the Ministry of Education where other agencies have, or can be expected to develop, management capacity. This has the advantage of investment in a mode of training that, by design, has greater potential for labor market linkages, efficiency, and flexible response to small and changing training needs. Locating training outside the Ministry of Education may increase the opportunities to provide adequate salaries for instructors, at least to the extent that they are not paid through the public school teacher salary scale.

The institutions should provide pre-employment training for youth, in-service training for workers, and re-training for unemployed adults. Enterprises can be expected to meet at least some of the costs of in-service training.

The curriculum should be built around a core of generic skills useful across sub-sectors of the economy. Many of these have been taught

for years, providing some base of materials and expertise. Examples include electricity, plumbing, auto and diesel mechanics, construction. Maintenance training should hold a prominent place. As institutional capacity in occupational analysis and curriculum development increases, these centers can begin to offer customized training to meet specific needs for upgrading or re-training, or for immediate employment expansion.

(b) Emphasize Investments in Quality

The complex institutional model of nonformal training, and the wide range of quality support mechanisms required (testing, curriculum, staff, management, enterprise linkages, system monitoring) demand significant investment in building institutional capacity. As is the case for instructors, salaries for VET managers and professional support staff must be competitive if the reliance on expatriates is to be reduced. Project support for salary costs may be necessary.

Support generally for the development of the training profession should be considered. Salary creates status. Beyond this, support for professional associations and activities would be helpful, and could serve the broader cadre of trainers operating outside the VET system in government agencies and in the private sector.

(c) Develop Capacity on Both the Demand and Supply Side

The quality and efficiency potential of nonformal training is realized through rapid response to changing training needs, curricula that are based on occupational analysis, the combination of center-based and on-the-job training, and in some cases the use of part-time instructors from enterprises. All of these elements require sustained and effective employer participation in the training system. The apparent assumption of past investment -- that this participation would develop spontaneously -- has not been entirely borne out by experience. A broader view of linkage development that includes investments in training and incentives for enterprise managers is worth consideration.

Enterprise management capacity is crucial to effective short- term planning for the mix and size of courses. Unless employers are able to determine and project skill needs with some accuracy, the labor market information necessary for efficient training will not be available.

(d) Concentrate Resources

Especially in the smaller countries, a few larger multi- purpose training institutions located close to enterprises are likely to be more efficient than a larger number of smaller, more dispersed centers. Decentralization is less of an issue in countries where the industrial sector is geographically concentrated. The record suggests efficiency gains from locating instructor training programs in training center facilities. As capabilities develop, training services can be extended to other areas, initially in skill areas with low equipment requirements.

(e) Market Training Services and Opportunities

Aggressive action by training managers to market services to agencies and enterprises is important to systems development, not in the least through cost-recovery. Equally important is marketing training opportunities to potential students when job opportunities are realistic.

(f) Experiment, Learn and Be Patient

It seems quite clear that, despite twenty years of investment experience, the model for cost-effective vocational training in small low income countries has not yet been identified. The directions for investment suggested here respond to obvious weaknesses in past and current practice. But they do not, together, constitute a complete and coherent model.

Many issues should be explored. How can training support informal sector employment, and small-scale enterprises? What role can NGOs play in providing skills training? Can private training institutions play a useful role? Where large enterprises exist, especially those with significant foreign investment, how can these be involved productively in providing training?

Careful monitoring and evaluation of future investments is crucial. Past practice in this respect has been entirely inadequate.

The record also suggests a relatively long period of sustained investments if effective training institutions are to be established. Sustained investment may be more important than the size of individual loans.

6.81 A number of these directions are being addressed in current projects in Sub-Saharan Africa. A focused review of the experience now being gained would be exceptionally useful to future investments.

The Vocational Secondary School

6.82 The recommendation for emphasis on nonformal training reflects not only world-wide experience, but also the current trends in low income countries generally and Sub-Saharan Africa specifically. As measured by World Bank lending the vocational secondary school has largely ceased to be a model for continued development.

6.83 The reasons have been discussed at length. Remaining is the crucial question of the future of these institutions. The review suggests one possibility: institutional reform to move the schools towards the operating characteristic of nonformal centers. This has been possible in middle income countries. If Ministry of Education structures can adjust to the needs for flexible curricula and higher staff salaries, and if employment demand exists, this strategy could work. Remaining would be questions about the comparative cost- effectiveness of the combined general

education/vocational training model, and the institutional difficulties of integrating education and training perspectives.

6.84 The alternative is to accept the lessons of experience completely, and to move sharply away from secondary vocational education. Some facilities could be converted to nonformal training centers; others could be recast as general secondary institutions.

6.85 This alternative leaves unanswered the question of how secondary education can do a better job, at low cost, in preparing students for continued training - either through nonformal centers or on the job. Clearly, such a policy shift would create both the need and the opportunity for curriculum reform and quality improvement. Indeed, it may in some cases be useful to consider means for quality improvement in secondary education together with investment strategies for vocational education and training.

6.86 New approaches to technological education are emerging in the developed world, with some adaptation for developing nations. By advancing new concepts and curriculum structures for science and mathematics, these curricula seek to increase the relevance of traditional subjects to modern technological developments. Other approaches include craft, design and technology curricula with similar intentions.

6.87 These curricula should be given attention regardless of choices made about the future of vocational high schools. In those cases, however, where Ministries of Education may move out of the vocational training role, these could provide the core of programs to strengthen secondary education in important ways.

Sub-Regional Cooperation

6.88 Developing a shared resource base for education development in small countries makes good financial sense, and indeed has been often proposed and occasionally attempted. Such efforts are beset with political and coordination problems. Nevertheless, to see French language curricula for training diesel mechanics in West Africa developed independently in several small countries is to force reconsideration of the possibility.

6.89 The review suggests that professional support institutions that integrate curriculum and testing development, and staff training, have made important contributions to quality and efficiency in larger middle income countries. Such institutions are especially important to vocational training because of the constant need to update curricula and materials, and staff capability. In the United States, highly decentralized vocational education and training systems draw heavily for curriculum and instructor training support on regional and national institutions, some financed through state consortia, others by the federal government.

6.90 The consortium model is of particular relevance to the developing country situation. As applied, say, in Anglophone or Francophone Africa, such a consortium would be based on financial contributions from member

governments. The institution would be governed by a Board of national representatives. It would undertake occupational analysis, curriculum specification and test item development for the core of courses common to member countries. This is the most costly and time consuming part of curriculum development. It results in a framework which can readily be adapted to local circumstances (i.e., differing levels of skills at entry, different course lengths). Where necessary, instructional materials (texts, handouts) can be produced locally at relatively low cost. Member country staff can be contracted by the regional institution to carry out part of the work, and could be seconded to the regional center for specific tasks. This, essentially, is the successful Vocational and Technical Education Consortium of the States (VTECS) in the United States.

6.91 The model could easily be extended to include trainer training, research and evaluation and technical assistance services for institutional development. Importantly, such an institution could provide the sustained support that institutional development requires, avoiding some of the problems inherent in project-bound technical assistance.

6.92 Such an institution would be costly, and would require significant external financing, probably over a ten to fifteen year period. If, however, a significant commitment is to be made to the development of vocational training in Sub-Saharan Africa, these support services must be put in place. Sharing the resource across small systems makes economic sense. Whether it makes political sense, of course, is a question to be addressed.

SUMMARY: IMPLICATIONS FOR THE WORLD BANK

6.93 The need for system rehabilitation and quality improvement in middle income countries, and for sustained systems development in low income countries, indicate a continuing need for investment in VET. The policy and institutional development content of these loans will be very high.

6.94 The Bank faces a significant opportunity, and an equally significant challenge, in providing support for vocational education and training over the balance of the century. The opportunity is to capitalize on the generally successful pattern of training system development in middle income countries, supporting increased efficiency as well as the continuing evolution of quality and the capability to assume new roles in technology transfer and productivity enhancement. The challenge is posed by the problems of developing cost-effective training systems in small low income countries, notably in Sub-Saharan Africa.

6.95 Both the opportunity and the challenge will require strong policy and operational commitment from the Bank. The level of analytical and design sophistication required in both circumstances is very high. In the middle income countries, continued development of policies, as well as planning and monitoring mechanisms that facilitate short-term adjustments to

labor market changes are both needed. The capability of the stronger systems to move effectively into technology dissemination and adaptation, or informal sector training, will need to be strengthened. Financing polices and mechanisms will need country specific analysis for feasibility and equity implications.

6.96 In the low income countries, problems of institutional design and efficiency will predominate. Labor market monitoring and analyses will be important. Implementation will be difficult in most circumstances, and recurrent cost financing will be required. Major issues in system governance remain to be addressed in many countries, as do questions regarding the future of vocational secondary schools. The possibility, at least, of regional professional support institutions should be explored.

6.97 In the first instance, these problems must be addressed within the regional framework of the Bank. The challenge to the Africa region differs substantially from that faced in the other regions. There the potential for inter-country cooperation in the face of common problems is very high, and a regional strategy and base of expertise for vocational training development will be needed.

6.98 In the middle income countries, and hence for EMENA, Asia and LAC, current investments are making significant contributions to systems improvement in many countries. Opportunities for further investments exist, however, and these will require a very high level of policy and institutional development content. Broad investment in science and technology development, already under way in few countries, should be expanded.

6.99 PPR should provide central policy and investment design support to the regions. Post-hoc evaluation of investment effectiveness will be of considerable importance. But continuing informal coordination and support for inter-regional exchange of experience will be even more useful.

6.100 Establishing the analytical basis for policy dialogue and effective investment design and supervision is likely to require a higher level of Bank staff support than in the past. The decline in the number of training professionals in the Bank over the past two years runs counter to this trend. The fragmentation of sectoral expertise in the reorganized Bank may also weaken the capacity to mount effective investment programs. Both trends are particularly troublesome given continuing high demand for staff support of project- related training and free standing sectoral training investments.

6.101 The full potential for high quality lending in support of vocational training is not likely to be reached with the present level of operational and policy staffing. Thus the Bank faces some hard choices. A strong policy and operational commitment could lead to significant advances in the low and middle income countries alike. If resources continue to be constrained, some priorities will have to be set within regions regarding VET. Given that the commitment to general education must remain strong, and

in some regions increase, these priorities will have to be set within vocational training, perhaps on a country by country basis.

6.102 To be avoided is a weak response in the form of low levels of analysis and design, and inadequate supervision. Short-term resource constraints should not prevent the Bank from effective responses to both the opportunity and the challenge.

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ANNEXES

Annex I: Methodology

Annex II: List of Projects and Components in the Sample

Annex III: Sector Work Analysis

Annex IV: Pattern of Investment in Institution-Building

ANNEX I

METHODOLOGY

1.01 A representative sample of industry VET components was selected for detailed analysis in response to the questions raised in the introduction. Because Bank projects often incorporate components designed to support a range of education sub-sectors (general primary education, secondary and non-formal VET, broad institutional development for the Ministry of Education, etc.), the project component is the most useful unit of analysis for a review restricted to any given sub-sector.

1.02 These components were analyzed using a questionnaire developed from a variable list based on a conceptual framework of VET.* These variables, and the corresponding questions, cluster around four main themes:

a. Description of the overall project and its VET components;

b. External Efficiency of component institutions;

c. Internal Efficiency of component institutions;

d. Financing of component institutions.

1.03 The questionnaire collated both quantitative and narrative descriptive and evaluative data. These were entered into a data base program for the personal computer that facilitates analysis across variables, including the integration of quantitative and textual information. This makes it possible, for example, to combine statistical data on costs and enrollments with narrative analysis of project implementation, and to structure the data along the comparative dimensions of the study: training mode, region, country income level and time.

Characteristics of the Sample

1.04 The universe of components for the four modes studied consisted of 213 VET components in 149 projects in 71 countries financed between FY63 and FY86. The total cost of these components (including contingencies) was $4929 million. One hundred and twenty-one of these components (56% of the total), drawn from 76 projects in 34 countries were selected for the sample. The total cost of VET components in the sample was $2,923 million, or 59% of the total cost for the universe of components.

*Drawn in part from Hunting, Zymelman and Godfrey. Evaluating Vocational Training Programs: A Practical Guide. World Bank, 1986.

1.05 The following criteria were used in selection of the projects from which VET components were drawn for the sample:

1. **Projects with >15% Total Project Cost in VET:** in order to focus on investments primarily supporting VET.

2. **Projects Initiated After 1975:** in order to concentrate on more recent experience.

3. **Preference to Sequences of Projects in the Same Country:** in order to gain insight into cumulating patterns of investment.

4. **Component Value >$1 million:** in order to emphasize more significant investments.

The second and fourth criteria were relaxed as needed to gain a sufficient number of components. The aim was to provide a balanced cross-sectional view of components of different types, and the relaxation of criteria one and four resulted in the inclusion of a few smaller and earlier components.

1.06 Both completed and on-going projects were selected for the sample. In the latter case, however, only those projects coming last in a sequence of at least two projects were chosen.

1.07 The sample was stratified to permit comparison of investments by mode, country income level, and region. As noted, the study examines industrial vocational and technical education and training delivered through four institutional modes. These were defined as follows:*

Secondary: Vocational education and training delivered through senior secondary schools that grant degrees, and that offer such programs as a principal purpose (and not through a "diversified" curriculum). These schools are generally operated by the Ministry of Education. In principle, secondary VET provides access to higher-level education and training.

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* A separate comprehensive review of Bank education investments found that these categories, with the addition of University-level VET investments, general teacher training and diversified secondary school projects, encompass the range of types of VET institutions supported by the Bank (see Schwartz, 1988).

Post-Secondary: VET programs that provide occupation-oriented training and generally require a secondary-level degree for entrance. These courses are operated either within existing universities or in centers such as polytechnics, designed specifically for technical purposes. Engineering schools made up a large proportion of such schools in the sample.

Non-Formal: Institutions that offer a variety of non-degree programs, from short-term, three-month courses to training of two and three years, and at all levels, from semi-skilled to management. The programs are designed to provide specific skills for employment. Some non-formal training institutions also provide in-service training through evening and in-plant courses, as well as training advisory services to enterprises. Non-Formal institutions are generally administered by agencies outside the formal education structure, such as the Ministries of Labor, Manpower, or Social Affairs, technical ministries, employers, labor, or professional organizations.

Vocational Teacher Training: Programs designed to prepare vocational teachers and instructors. These include formal degree programs for all modes, as well as certificate level programs for instructors in non-formal institutions. The former are generally housed in universities and colleges; the latter are generally shorter in length, draw from workers with occupational experience, and are often accommodated on the same premises as the VTC they are intended to serve.

1.08 The second dimension of the sample was the income level of the country, using the annual per capita income categories of the 1986 World Development Report: Low ($400 or less), Lower-Middle ($401-$1,600) and Upper-Middle ($1,601 or more). The third dimension was the World Bank regional structure of Africa, Asia, Europe/Middle East/North Africa (EMENA), and Latin America/Caribbean (LAC).

1.09 Characteristics of the sample, as stratified by these three dimensions, can be seen in Tables 1 and 2. Table 1 shows the distribution of components by region and mode. The samples of EMENA and LAC components are proportionally representative of the universe, with sample and total component percentages of 37% and 39%, and 13% and 15% respectively. African components account for 27% of the total, and the sample 21%. In contrast, the Asia component sample was disproportionately large, with sample and total component percentages of 28% and 19%. The relative undersampling of Africa components was due to the many small (less than $1.0 million) components; the oversampling in Asia to the large number of countries with sequences of project investments.

Table 1: Characteristics of the Sample: Distribution of Components by Region and By Mode

(sample in parenthesis)

			Components By Mode				
Region	Countries	Projects	Secondary	Post-Secondary	Nonformal	Teacher Training	Totals
Africa	28 (13)	44 (16)	21 (12)	3 (1)	25 (8)	8 (5)	57 (26)
Asia	11 (5)	31 (22)	6 (7)	12 (10)	17 (12)	5 (5)	40 (34)
EMENA	16 (8)	47 (25)	14 (8)	20 (11)	33 (19)	16 (7)	83 (45)
LAC	16 (8)	27 (13)	5 (5)	4 (2)	22 (8)	2 (1)	33 (16)
Total	71 (34)	149 (76)	46 (32)	39 (24)	97 (47)	31 (18)	213 (121)

1.10 The sample is proportional to the total of components for upper-middle income countries. It over-represents lower-middle income countries (52% versus 42%), and is less than representative for low income countries (19% versus 25%). (See Table 2) These relatively minor biases again reflect heavier emphasis on sequences of project investments and on components valued at more than $1.0 million.

Table 2: Characteristics of the Sample: Distribution of Component by Income Level and By Mode (sample in parenthesis)

Income Level	Countries	Projects	Components By Mode: Secondary	Post-Secondary	Nonformal	Teacher Training	Totals
Low	24 (12)	41 (16)	14 (6)	4 (2)	26 (9)	10 (6)	54 (23)
Lower-Middle	29 (13)	62 (30)	20 (15)	13 (11)	44 (28)	13 (9)	90 (63)
Upper-Middle	18 (9)	46 (30)	12 (11)	22 (11)	27 (10)	8 (3)	69 (35)
Total	71 (34)	149 (76)	46 (32)	39 (24)	97 (47)	31 (18)	213 (121)

1.11 As indicated above, the sample included 76 projects drawn from a total of 149. There were 17 "cluster" sequences, accounting for about 78% of the sample, selected to study the evolution of investments. These cluster projects occurred in Bangladesh, Pakistan, Sri Lanka, Cameroon, Ecuador, Egypt, Jordan, Indonesia, Ivory Coast, Morocco, Turkey, YAR, Algeria, Brazil, Korea, Malaysia, and Mexico.

The Data

1.12 Data were drawn primarily from Staff Appraisal Reports (SAR) and Project Completion Reports (PCR). These data are weak in many respects. SARs do not deal uniformly with project justification and planning, the elements in the design of a component, or costs. PCRs rarely contain adequate information on project educational outcomes since they are written at the completion of the physical components of a project. After preliminary analysis, 3 countries with successful VET investment programs were chosen for further research: Jordan, Brazil, and Korea. For these countries, collateral documents were examined, and interviews with projects officers were conducted to gain a more in-depth understanding of VET investments.

Annex II: List of Projects and Components in the Sample
(*Completed projects)

AFRICA

Gambia I FY78	NF Tech. Institute Secondary Technical Schools
Guinea I FY79	Secondary Technical Schools Instructor Training Institute
Chad II FY71	Secondary Technical Schools
Ivory Coast I FY69	NF Training Center PS Higher National Technical Institute Secondary Technical Schools
Ivory Coast III FY80	NF Vocational Institutes
Cameroon II FY72	NF Adult Vocational Guidance & Training Center Secondary Technical Schools
Cameroon III FY76	Secondary Technical Schools
Cameroon IV FY86	NF Adult Vocational Guidence & Training Center Ministry of Labor Directorate of Manpower Secondary Technical Schools Education Planning Division and Directorate of Technical and Vocational Education, MOE
Gabon II FY76	Secondary Technical Schools
Senegal III FY79	NF Industrial Training Center National Vocational Training Office TT Technical Teacher Training College

Annex II: List of Projects and Components in the Sample
(*Completed projects)

AFRICA

Tanzania VI FY79	Vocational Training Centers Technical Secondary Schools Instructor Training Center
Kenya V FY81	Industrial Training Centers
Burundi II FY80	Trade Training School School for Public Works
Burundi II	Mechanics Department
Zaire I FY72	Technical Secondary School Technical Teacher Training College
Swaziland I FY75	Industrial Training Institute
Ethiopia VI FY85	Technical Teacher Training College

ASIA

Indonesia I FY71	Technical Training Centers (TTCs)
Indonesia IV FY76	Technical Training Centers (TTCs) Vocational Training Centers Secondary Technical Teacher Training (for TTCs)
Indonesia VII Polytechnic FY79	Polytechnic
Indonesia Second Polytechnic FY84	Polytechnic Polytechnic Education Development Center

Annex II: List of Projects and Components in the Sample
(*Completed projects)

ASIA

Indonesia Public Works Manpower Development FY83	National Ministry of Public Works Training Center Regional MPW Training Centers
Indonesia Manpower Development FY86	Ministry of Labor Manpower Planning & National/Regional Training Councils Vocational Training Centers Industrial Training Development Units Mobile Training Units NF Teacher Training Centers
Korea First Education Project FY69	Secondary Technical Schools Junior Colleges
Korea Education II FY73	Secondary Technical Schools Junior Colleges
Korea Education III FY75	Technical Secondary School Vocational Training Institutes
Korea Education IV FY77	Vocational Training Institutes Central Vocational Training Institute
Korea Sector Program, Higher Technical Education FY80	Junior Colleges
Malaysia Education I FY69	Technical Secondary Schools Vocational Secondary Schools

Annex II: List of Projects and Components in the Sample
(*Completed projects)

ASIA

Malaysia Education II FY72	Technical Secondary Schools Vocational Secondary Schools
Malaysia Education III FY74	Polytechnic
Malaysia Education IV FY77	Industrial Training Institutes
Malaysia Education VI FY82	Polytechnic Industrial Training Institutes
Malaysia Education VII FY86	Polytechnics Industrial Training Institutes
Bangladesh I FY73	Technical Training Institutions (TTIs)
Bangladesh III FY79	Technical Training Centers (TTCs) In-Plant Training
Bangladesh VIII FY84	Polytechnics Engineering College Teacher Training
Sri Lanka I FY81	Technical Training Institutes
Sri Lanka II FY86	Technical Training Institutes

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Jordan I FY72	Polytechnic (& Trade Training Center)
	(Polytechnic) & Trade Training Center
Jordan II FY75	Ibrid Polytechnic Aqaba Trade Training Complex

Annex II: List of Projects and Components in the Sample
(*Completed projects)

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Jordan III FY80	Saahab Training Complex
Jordan IV FY82	Trade Training Center General Vocational Secondary Teacher Training Department Tafilah Polytechnic
Jordan IV	Community College
Jordan VII FY86	Trade Training Center
Turkey II FY84	Industrial Training and Development Center
	Technician Training Centers
Turkey III FY87	MOE Apprenticeship Training Centers Public Training Centers Adult Technical Training Centers Women Training Centers
Egypt I FY77	Technician Training Schools Technician Training Institutes
Egypt I	Vocational Training Centers Technical Teacher Training School Instructor Training Centers
Egypt II FY79	Technical Training Schools
Egypt II	Vocational Training Centers Handicraft Skills Training Center Technician Training Institutes
Egypt III FY81	Vocational Training Centers Skills Training Centers
Egypt IV FY83	Vocational Training Centers Instructor Training Institute
YAR FY73	Vocational Training Center

Annex II: List of Projects and Components in the Sample
(*Completed projects)

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YAR II FY76	Vocational Training Centers
YAR V FY83	District Training Centers
YAR VII FY86	Technical Secondary School Vocational Training Center National Technical Training Board (NTTB) Polytechnic
Morocco IV FY79	Technical Lycees Higher Institutes of Technology Post-Secondary Engineering Schools Technical Teacher Training College
Morocco VI FY85	Vocational Training Centers
Morocco VI	Mobile Training Units
Morocco VI	Instructor Training Center
Tunisia IV FY81	Vocational Training Centers Apprentice Training Center National Training Agency
Algeria I FY73	Algerian Petroleum Institute Institute of Mining and Metallurgy
Algeria II FY76	Technological Institute
Algeria III FY77	Technicums Vocational Training Training Centers (CEP)
Algeria IV FY78	National Institute of Mechanical Engineering (NIMET)
	Institute for Vocational Instructor Training (IVIT)
	Technical Teacher Training College (ENSEP)

Annex II: List of Projects and Components in the Sample
(*Completed projects)

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Algeria V FY80	Maintenance Training Center Industrial Training Centers
Algeria V	Institute for Instructor Training for Maintenance Trades National Institute for Maintenance Trades Administration
Pakistan V FY81	Vocational Training Centers National Vocational Training Management System
Pakistan VI FY86	Vocational Training Centers National Vocational Training Management System
El Salvador III FY78	Vocational Training Centers
Dominican Republic II FY75	Vocational Training Centers
Barbados II FY86	Vocational Training Centers Barbados Community College
Brazil I FY72	Operational Engineering Center Upper Secondary Vocational School
Brazil III FY77	Vocational Training Centers
Brazil V FY84	National Training System
Paraguay II FY77	Vocational Training Centers
Uruguay I 78	Vocational Training Centers
Mexico I FY82	Technical Training Centers
Mexico II FY86	Technical Training Centers

Annex II: List of Projects and Components in the Sample
*Completed projects)

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Ecuador I FY69	Technical Secondary Schools
Ecuador II FY76	Vocational Training Centers
Ecuador III FY83	Vocational Training Centers Instructor Training Center

Annex III: Impact of Sector Analysis on Investments

Region/Country	Sector Analysis	Timing in Project Sequence	Notes on Impact on Investments
Asia			
Korea	Yes	After first, fourth and fifth	Basis for three subsequent investments with significant institution-building components. Focus on science & technology in later analyses.
Indonesia	Yes	Before first; after second and third	The second study was the basis for investments in polytechnics. The third addressed policy issues, including free-standing training.
Malaysia	Yes	Before second; after third and fourth	Development of institutional planning and management capacity late in project sequence after problems encountered, based on mid-term sector work. Focus on science and technology in later analyses.
Bangladesh	Yes	After two	Institution-building.
Sri Lanka	No		Free-standing training project
LAC			
Mexico	Yes	After first	Some analytical basis for institution building in second project.
Brazil	Yes	After second	Analysis led to significant institution-building project.
Barbados	Yes	Before only project	Done very early. Project has strong institution-building focus, but no direct relationship to sector work
Paraguay	Yes	Before only project	Project has institution-building focus, but sector study gave little formal attention to VET.
Dominican Republic	Yes	Before only project	Some institution-building for national system.
Ecuador	Yes	After three projects	Focus on institution-building and labor market analysis.
El Salvador	Yes	Before only	Basis for investment in national system (project fails).
Uruguay	Yes	After only	Cursory treatment of policy and institutional issues.

Region/Country	Sector Analysis	Timing in Project Sequence	Notes on Impact on Investment
EMENA			
Jordan	Yes	Before second, fourth and fifth	Institution-building for national system. Increasing policy and institutional emphasis. Focus on science and technology in later analyses.
Turkey	Yes	Before first and second	Institution-building for national system. Focus on science and technology in later analyses.
Morocco	Yes	Before first and second	Institution building for national system in later analyses.
YAR	No		(Institution-building in last project).
Egypt	No		(Some institution-building in later projects).
Algeria	Yes	Before third and fifth	Troubled sequence of investments. Institution-building in last project. Sector work relatively weak on policy and institutional issues.
Tunisia	Yes	Before only	Institution building for national system.
Pakistan	Yes	Before first; After last	Institution building for national system related to very early sector work. Later SW emphasizes need for use of short-term labor market information.
Africa			
Ivory Coast	Yes	Between first and last	Institution-building for vocational training centers.
Cameroon	Yes	Between second and last	Institution-building for national system.
Kenya	Yes	Before last	Institution-building for technical education in MOE; sector of indirect relevance.
Tanzania	Yes	Before last	Equity strategy for rural development, little VET policy content (but other donors active in sector analysis).
Guinea	Yes	Before only	Little VET policy content.
Senegal	Yes	Before only	Institution-building for national system.

Region/Country	Sector Analysis	Timing in Project Sequence	Notes on Impact on Investment
Africa (continued)			
Gambia	Yes	Before only	Little VET policy content
Gabon	Yes	Before only	Little VET policy content.
Chad	Yes	After only	Some VET policy content.
Ethiopia	Yes	Before last	Institutional development in Ministry of Education. SW augmented by project-financed studies.
Swaziland	Yes	Before only	Six years prior to project, but attention to policy and institutional issues.
Zaire	Yes	After only	Focus on policy and institutional issues.
Burundi	Yes	Before and After only	First study focused on training content; later analysis gives more attention to policy issues.

Annex IV : Pattern of Investment in Institution-Building

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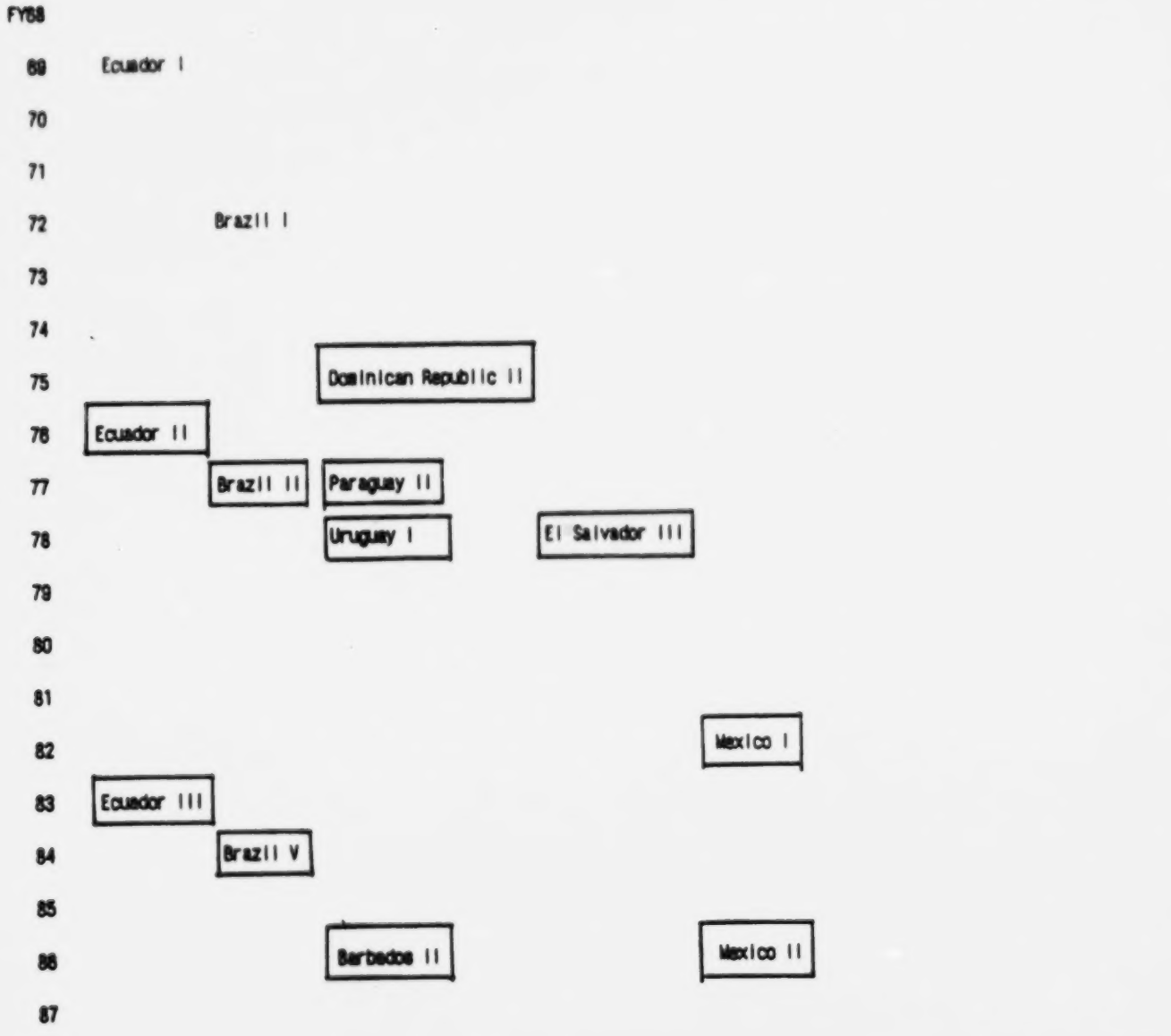
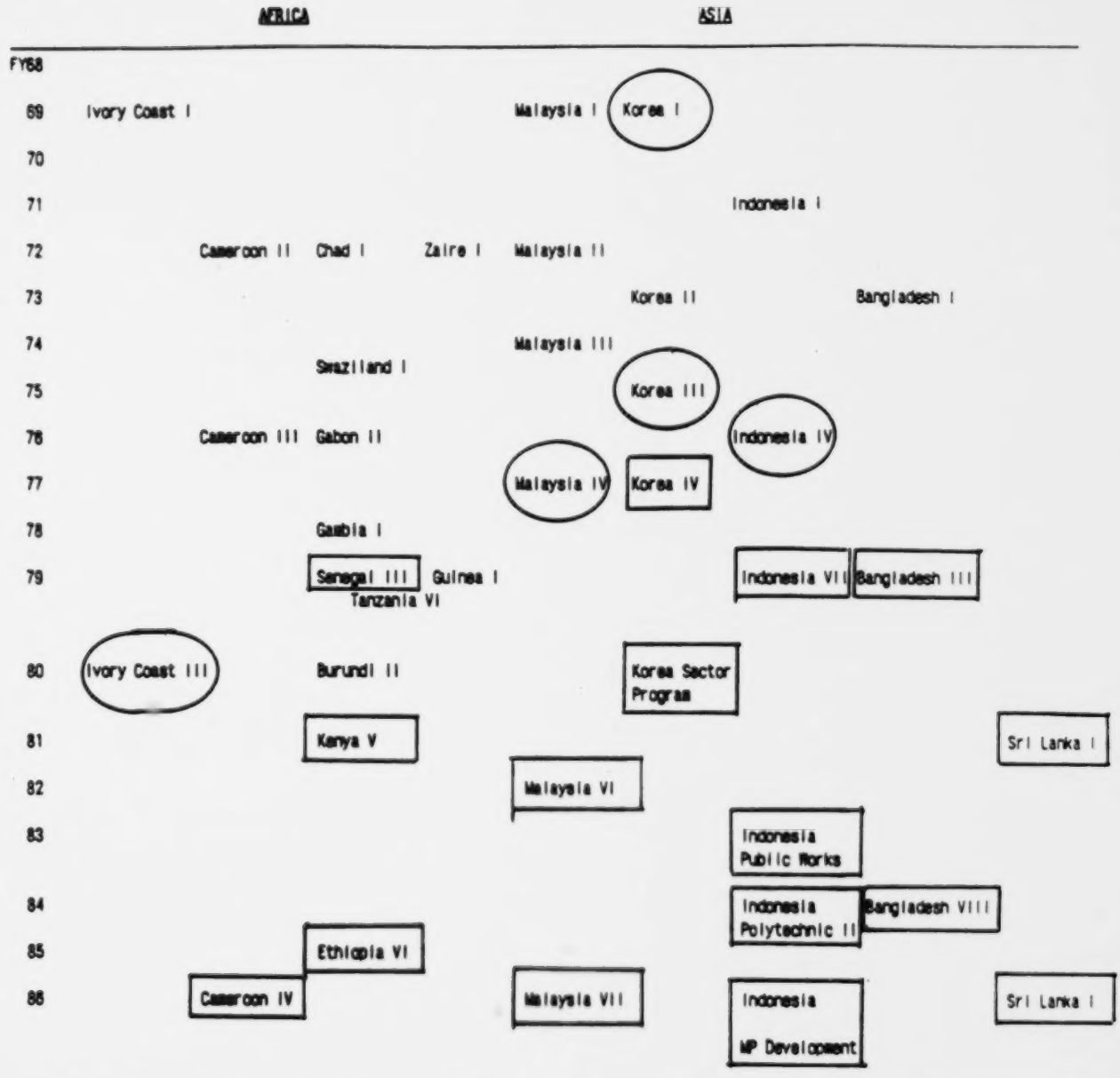


Annex IV : Pattern of Investment in Institution-Building



Annex IV : Pattern of Investment in Institution-Building

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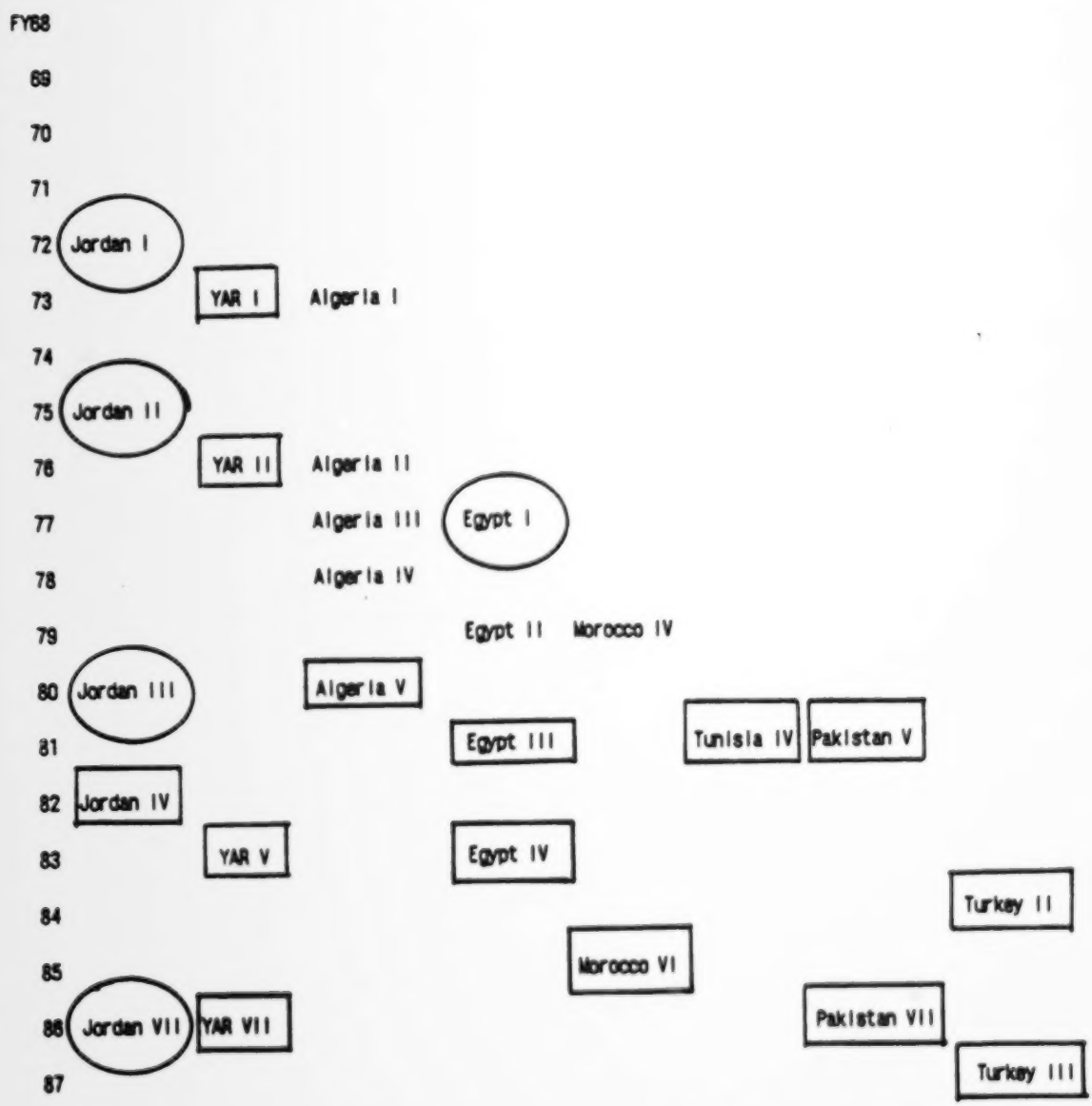

- Some Institution Building

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